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ISAAC ASIMOV:

Genius in the Candy Store

By SAM MOSKOWITZ

IT HAS long been claimed that science fiction is a field and not a road; that the truly gifted craftsman could weave any of the patterns of world literature into its fabric without destroying its design. It has also been admitted that the most difficult element to incorporate into science fiction—without destroying the integrity of both—was the deductive formula of the detective story.

Acknowledgment that this literary feat has been accomplished on a number of occasions appears in the scholarly *Development of the Detective Novel* by A. E. Murch M. A. (Peter Owen, London, 1958), where she states: "Two writers . . . have succeeded admirably in merging 'science fiction' with detective themes: Frederic Brown and Isaac Asimov, whose work has attracted attention on both sides of the Atlantic and who may inspire a vogue for this specialized

variation of the *genre*." It is no discredit to Frederic Brown, a master of the detective story in its own right as well as a gifted science fiction writer, to state that when it comes to blending

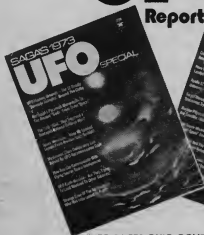


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the two Isaac Asimov reigns supreme.

By every measurement Asimov's *The Caves of Steel* and its
(cont. on page 59)

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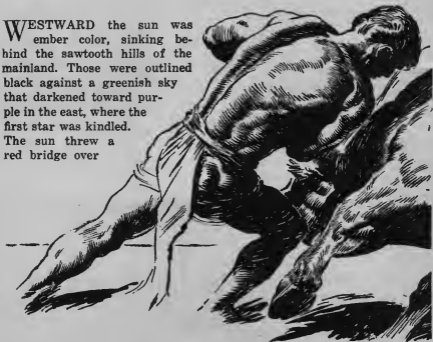
GOODBYE, ATLANTIS!

By POUL ANDERSON

Illustrator FINLAY

In the crystal tower of the Holy the ancient rituals were done. And then, They came: four naked brains housed in heads of bronze. And whether they were Gods or Demons, Owan would never really know.

WESTWARD the sun was
ember color, sinking be-
hind the sawtooth hills of the
mainland. Those were outlined
black against a greenish sky
that darkened toward pur-
ple in the east, where the
first star was kindled.
The sun threw a
red bridge over





the narrows, turned the open ocean northward and southward into molten brass, and splashed on the towers of Usant.

Standing in the roof garden of Falconhome, Owan felt the wind. It blew most softly, rustling the leaves and blossoms around him, but it was cold. He draped the blue cloak on his left shoulder about the guardsman's cuirass, stamped his feet, and wished that his knees were not left bare between kilt and boots. When he leaned over the parapet he could hear somewhat of the city traffic, wheels, engines, shrunk at this fifty-story height to a whisper. Lamps were being lit down there, between stiff tower walls. The glow fell on horsemen, carriages, ox-drawn wagons, people afoot, and a new steam-powered train which came puffing like a toy along the tracks laid in Kraken Street. Higher up, where the last crimson sunlight could still touch them, windows blazed.

The ax hung at his belt rattled against a marble lion whose mane was living ivy. He kissed the javelin in his hand to show that he meant no disrespect to Shridnu, Whose emblem is a lion. Owan came of plain sailor folk, and though he had served a few years in the royal guard he remained devout. In appearance he was tall, blunt-faced, blue-eyed; the hair beneath his winged helmet was reddish brown.

A footfall on the graveled path fetched his mind back to earth. He turned. The heart sprang in him when he saw Rianna.

"Good eventide, my lady," he said, bending the knee.

She nodded. "Good eventide to you, Captain. I came to tell you that we shall eat soon; but first my husband invites you to drink wine with him."

Why did she not send a servant? His pulse thudded. *Did she want an excuse to see me alone?*

Then she went to the parapet, breathed deeply, and said with a small sad laugh, "After an hour supervising that dolt of a cook, I had to have some fresh air. He cannot get through his head that Donwirel likes a chop lightly sautéed, not fried to leather."

He regarded her—graceful in her white robe, with tawny hair flowing past a face as cleanly shaped as the face on Lady Maruna's image in Her temple—and he thought drably, *If this wife of another man were not so full of love for him, would she be as fair as she is?—Yes. More so.*

"A pleasant evening," he fumbled.

"Cold," she replied. "The sun looks misshapen, as if a devil had stepped on it. And the ships of Wir are still on patrol."

HIS gaze followed her uneven gesture. The flare on the sea was too brilliant for him to spy

many of the besieging fleet. But some hulls and masts were visible, black and lean. He knew how many others ringed this island. A few more such weeks, and not even the nobles in their penthouses would have sautéed lamb chops. Already the poor were trapping mice to eke out their rations.

"How long will they wait, Ow-an?" Rianna asked, low-voiced.

"Until Usant admits that Wir is the rightful king," he shrugged.

"Yes, yes; I know; and that will not be till we are dead." Pride drove the hurt from her tones. Her uncle was the old king, whom the rebels had slain; her father was now regent; her infant nephew had been crowned in Windspear Tower, after Usant's shore batteries had sunk enough ships to prove to Wir that he could never make a landing while those gunners lived.

"Of course they will blockade us as long as they can," Rianna continued. "But how long will that be?"

"I dare not talk about that." Involuntarily Owan glanced at a building near the middle of the island, gray and steep-sided, its roof domed in clear quartz that flung back the sunset like a beacon: the tower called Holy.

Rianna laid a hand on his. Even through his gauntlet, he felt her touch, more strongly

than fire or sharp steel. "Don-wirel has grown so haggard," she whispered. "Often at night I feel him jerk in his sleep, as if a devil stabbed him. He cannot tell me anything . . . oh, yes, I know he's sworn to secrecy, and I would never ask him to break an oath . . . but he is so rigid about it. You know him, Owan. After a year as his guard, you know how stern his honor is. He will not give me so much as a hint whether Govandon's work is going well or badly. And that—not knowing—not daring to bear his child, because it might starve in the siege—that gnaws me. And he knows it does—and it hurts him that I am hurt—and that hurts me again!"

Owan looked into the desperate green eyes and blurted, "I shouldn't tell you this much myself. But . . . it's going well Govandon Archpriest lacks very little to complete his work."

"Oh," she said faintly, and leaned on him for a while that he wished were much longer. When at length she raised her face to him, he saw radiance.

"If ever one soul helped another, Owan," she said, half laughing and half gulping, "you have just aided me. Will we really be free again? I can't thank you enough—"

He stared at the sea, hoping she would not read his expression. But she did, and he felt

some of the joy leave her. "You don't seem overly glad about this," she remarked uncertainly.

He bit his lip. "Well, my lady, let's just say I'm prejudiced about the means that Govandon plans to use."

"But he is the Archpriest!"

"I know, I know. He's explained to me, with texts and fine reasoning, that it'll be lawful. But my father was an old-fashioned man."

"Then you should be all the happier to help keep alive the old-fashioned ways. Surely Wir, with his antheap philosophy, is more than a rebellious pretender. Anything is lawful to stop him."

"No argument, my lady. After all, I joined up as soon as the fighting began. Even during the retreat from Lanlen, when our bare feet tracked blood in the snow, and his damned talking birds flew past and promised us food and clothes if we'd desert, and every morning more men had disappeared . . . I never quit." Owan realized he was bragging. "Excuse me, my lady, I'd better go join your husband. Set your mind at ease about Govandon. I'm sure everything will be all right."

He went from her with unnecessarily long strides.

THE penthouse was smaller than most, but tasteful, in the portico-and-cupola Isteth style.

As he entered the reception room, Owan kissed his javelin to the ivory image of Vedan. Candles burned clear and unwavering before the niche; even in miniature, the grave bearded face and the muscular arm upholding the eagle gave an impression of size. *Father, forgive us*, Owan thought, for his forebodings about Govandon's work were still heavy in him.

His fisher kin might have hoped for some token of response, perhaps a flicker in the light making the chiseled countenance look approving or angry. But Owan had learned from the noblefolk that the images were not the gods. The gods, Vedan, Shridnu, Kalivashtu, and the Lady Maruna, dwelt on some remote plane of existence, incomprehensibly above man's universe. To guard us They had had Their natural laws and principles of righteousness. Chants, incense, prayers, good works did not reach Them, nor draw Them down to us; rather, we were raised infinitesimally nearer to them.

Unless—

Owan discovered that his jaws were clenched so tightly they ached. He hastened on to the refreshment room.

That was small and circular, with exquisite peacock mosaics. Modern gas lamps illuminated it and a fire crackled cheerily on

the hearth. Donwirel, husband of Rianna, hereditary Marchmaster of Isteth (where now Wir's overseers drove the peasants with lash and pike off their ancestral farms and into huge communal ranches), special assistant to Govandon Archpriest—Donwirel, thin and handsome in a loose golden-scaled tunic, sat at the table. He drank from a carved elephant tusk. A goblet of smoky glass stood across from him. Closer at hand was a carafe whose contents glowed like ruby.

"Ah, good eventide, Captain," he smiled. "Be seated. Have some wine."

"My lord is most kind," Owan said unsurely. He always ate with Donwirel and Rianna—his task of guarding the nobleman required it—but he had never yet been asked to share a draught. On duty he had worn loneliness like a helmet; off duty, he repaired to the waterfront, where common soldiers and sailors were more easeful company and where he could sometimes forget how sunlight touched Rianna's hair.

"I feel celebratory," Donwirel said. "In a few days, luck willing, this whole wretched business comes to an end."

Despite his own knowledge, Owan must push down terror. It was one thing to comfort Rianna, another to meet the reality. "Is my lord indeed so sure?" His

voice sounded odd in his ears. "When last Govandon Archpriest spoke in my presence, he said there were certain doubts remaining in his mind."

Donwirel's dark eyes fastened keenly on the guardsman. "What manner of doubts?" he inquired.

"About . . . how to summon the gods. The only sure way to bring Them is one he'd rather not use. He hopes to find some other means, equally safe. . . . More than that I didn't hear."

Still Donwirel studied him. "I thought you a bold man, Owan."

"I like a good fight as well as anyone, my lord. But this—I'm a simple man. I don't pretend to understand magic. And, well, naturally a person's always fretted most by what he doesn't understand."

"Sit down," Donwirel urged. "Fill your goblet. Be at ease."

"I gather we won't be needed tonight at the Holy?"

"No. Govandon works alone, burrowing through the archives. No one else is alive today who can read some of those texts. Prophets like Yevan and Nifedd are thousands of years in their graves. Language changes; the prophetic utterances are distorted in successive translations, finally are altogether lost. Govandon seeks to reconstruct what those ancients actually discovered about the gods. No, we can't help him at this stage."

"I never helped at all," Owan said. He placed himself on the edge of a chair. In some vague part of his mind he noticed with surprise that he was elaborately denying having had any part in Govandon's work. "I was only there to guard you against enemy agents, my lord."

"And make sure I don't serve Wir's cause myself." In his neatly clipped beard, Donwirel's teeth flashed white.

"My lord!" exclaimed Owan, shocked. "No one ever believed you could be a spy."

"Of course not, or I wouldn't have been asked to help Govandon," Donwirel said. "However, you know as well as I do that Wir's philosophy has been in existence for many years and has many adherents. Not all of those adherents have openly declared themselves, even now when Wir has the whole mainland. Anyone here on Usant could be an enemy agent, biding his time. It's sensible to decree that every man assisting Govandon be accompanied by a guard of assured loyalty, everywhere he goes." He laughed. "I've enjoyed your company, anyhow, tongue-tied though you are most times. Come, drink up there! You haven't even poured your wine."

OWAN obeyed. The liquid gurgled from the carafe, loud in the silence. Even so had blood

gurgled from that bull whose throat Donwirel cut in a certain crypt, after Owan had wrestled the huge bellowing animal down onto the stones. . . .

He shuddered to recall what rustlings and whisperings had been heard when the bull died and the torches went out. The men had departed, sealing the door with a signet from the tomb of a forgotten king; but next morning only the bull's bones were found.

Other things had been done in the Holy which Owan did also not care to dwell on. Mostly, of course, he had yawned, or played tossgave with his fellow guardsmen, while the learned ones pondered ancient books and threshed out long syllogisms. He had never imagined it would be so difficult to understand the gods. "They ask nothing of you but your duty to other men, and a bit of kindness," his father had said. "If you want to put garlands on Their images as well, that's up to you; They won't mind." But Govandon created a homunculus which died when it first saw the sun but yelled certain things in its fever that the Archpriest needed to know.

Owan was glad that Donwirel's part in the work had been, for the most part, clean. The Marchmaster helped study the old volumes, performed strenuous ritual dances, practiced asceticisms

in the hope of revelation, observed patterns in the stars—It would not have been well for one who had burned a white panther in a wicker cage to come home and kiss Rianna.

"What's wrong?" Donwirel asked. "You look like a death's head."

Owan stared at his wine. His eyes weren't quite focused. "I was just thinking, my lord, how glad I'll be when this is indeed finished."

"We had many ugly tasks," Donwirel agreed. "But how could we help it? For more than a thousand years, ever since the Bright Prophet, men have not invoked the gods directly. What used to be known about such procedures is long buried. In fact, the knowledge was suppressed. We've had nothing to go on but hints, traditions, legends, fragmentary manuscripts at the bottom of the archives. We've had to grope our way."

"Yes, yes, my lord—"

"And in fumbling along, naturally we repeated many mistakes of our ancestors. We had to try everything, no matter how barbaric. And worship was barbaric prior to the Bright Prophet. Blood sacrifice, often human; drugged sybils, self-tortured anchorites, temple slaves; orgy, delirium, and fear. That's what the Bright Prophet spoke out against: and rightly so. But in

all the horror of those days, there was a kernel of truth. It's a historical fact that some kings and archpriests did have the direct help of the gods. At least, they had powers we can't duplicate today. And they themselves said the gods appeared to them."

"If they didn't mistake devils for gods!"

The words seemed to come of themselves from Owan. He put down his half lifted goblet, appalled. But Donwirel nodded calmly.

"Yes, Captain, that idea has been discussed too. It's contrary to orthodox belief, I know. Everyone's been taught, for instance, that Cuedd the Glorious got the personal help of Kalivashtu when the heathen were at his gates. But sometimes when you saw us scholars whisper with Govandon, you guardsmen, we were considering the possibility that it was actually a devil which Cuedd had raised. Because it really doesn't quite make sense that all-merciful Kalivashtu, the Lifegiver, would destroy men with fire. Does it?"

Owan kissed his javelin. Donwirel sipped and continued: "I may as well tell you, since we're under the same oath, that that's why we delay. Since he does not like to use the one sure, safe method of calling the gods which we discovered, Govandon has developed an alternative procedure.

But he has to make certain beforehand of Who, or what, that ritual will bring."

"If the summoned one does turn out to be a devil—"

"Well, we're not above using such assistance; but it demands special precautions. A devil would turn on us after it had fulfilled our command and was free again: unless, that is, we had prepared the right magical shield. A god, though, answering our prayer, would be another case entirely."

"I don't know—I mean, naturally! Of course!"

"You still look worried. Come, tell me, what's wrong?"

Owan sighed. "I was just wondering, my lord. What is the answer? I mean, suppose it really was the gods Who did all those cruel things in the old days. Then how can They be wise and just and merciful?"

"That is quite a problem," Donwirel admitted. "Govandon's answer is as follows. Our ancestors were on a lower plane of spiritual evolution. They would not have understood the austere concept of divinity we now have. So the gods must perforce manifest Themselves in ways that men could grasp. In this manner, men were slowly led upward from savagery. At last they had evolved so far that the revelations given the Bright Prophet could be comprehended by ordi-

nary people. Then the gods departed for Their own plane of existence. Man was now able to take care of himself."

"Um-m-m . . . well . . . what about the savages across the ocean? Have the gods abandoned them?"

"No. Someday we will establish colonies there and teach those poor woodsrunners what the Bright Prophet taught us. We are the chosen instrument of the gods, you see."

"An instrument which Wir would break," Owan murmured. "Yes, now I understand. And that's what gives us the right to call the gods back to earth. It's not just us in danger, it's the whole future of man."

"No doubt," said Donwirel dryly. "But don't be so serious, my friend. Drink. To your health!"

He raised the elephant's tusk. Owan clinked his goblet against it and poured the wine down his throat in the lusty fisherman style.

THE taste was unexpected. For a minute Owan hesitated, moving his tongue against his teeth. What did that slight bitterness remind him of—? The smile vanished from Donwirel's features. Very still the Marchmaster sat. The tigers on his ivory horn seemed to have more life than he did. Owan noticed

that Donwirel had drunk little.

His ears buzzed. He shook his head, trying to clear away a mist. The noise grew louder, became a sound like surf, like an incoming tidal wave. Suddenly the room spun. Owan tried to cry out, but it was a croak in his gullet. Somehow he got to his feet. A peacock shimmered in the wall. He took one step. His knees buckled. He went to the floor.

Dimly through darkness and roaring he heard Donwirel whistle. A rear door opened. From the study beyond there came a man who was tall and yellowhaired. He wore a green tunic which he was already unbuttoning. Donwirel stooped over Owan and began to strip the guardsman's armor. Owan screamed at his body to move. No sound came forth. His arms flopped limply as Donwirel turned him on his face.

Night closed down. When it lifted again, Owan heard—in the booming and buzzing and distortion—"Yes, his stuff fits me well, my lord. You gauged our sizes right close."

"Good. Let me see . . . here, be careful. Your helmet has got to cover your hair entirely or someone will be sure to notice you aren't him. Otherwise you look enough alike. The sentries won't pay close attention; after so many months, you're just part of my outfit. But remember, if we meet anyone high-born, don't

bow. Bend the knee. You're supposed to be a commoner."

A toe nudged Owan. "What'd you give him, lord?"

"A pinch of bledwin powder in the bottom of his goblet. I thought he'd never drink. Very well, let's be on our way. The sooner we get those papers and get off this damned island, the happier I'll be."

The tide rose again, drowning their footfalls. Owan clawed at consciousness, but it slipped from him. Once he thought, far off, that drowning must feel like this, toward the end, when your lungs were full of the sea. . . .

HE was being shaken. A gull mewed, shrill and hungry. The tide had rolled his corpse onto a beach, he lay awash, the gull came down as the surf receded. Wings whistled overhead. The gull landed heavily on his chest. Its beak struck into his throat. His lids flew open and the sun stabbed his blind eyeballs. He strangled on sea water.

"Again, Owan. Again!"

Vomiting racked him. He thought he was going to tear his belly muscles loose from his bones. Long after his stomach was empty he continued to retch and shiver in the serving woman's arms.

"There, there," she muttered. "There, there, master. You're all right now. Right away I saw you

lying there and smelled the smell I did in that broken goblet, I knew you'd drunk from the blood-wine flower. Nor long ago, for a finger down your mouth has brought you back. Be easy, mistress. He's come to no harm. We arrived soon enough."

"Owan!" He forgot his headache when he saw Rianna. She knelt beside him, seized both his shoulders and shook him. Her hair streamed over his breast. "Owan, what happened? What's wrong? Where's Donwirel?"

He groaned to a sitting position. The maid went out. Rianna brought herself under control and stroked his forehead until the other woman returned with a basin of water and some towels.

"First we'll swab you, master," she said matter-of-factly, "and then you'd best wrap this other one around your shoulders, or you'll catch cold lying there with naught but a loincloth. You're no fit sight for my lady, that's certain."

"I'll take care of him. Arva," said Rianna. "Go make some tea."

"But, mistress—"

"Shall the blood royal not serve its own servants? Go, I told you."

The maid gulped and obeyed. Rianna washed the foulness off Owan, murmuring to him. By the time she finished, he was able

to totter erect. Irrationally, he looked first for the green tunic. The man in the study had worn a green tunic, which he must have discarded when he donned Owan's uniform. How could anyone address earth's most beautiful lady, wearing only a towel?

He found the garment and slipped it on. Rianna guided him to a chair. "Can you speak now?" she asked. "Don't let me hasten you. I'm sure Donwirel is unharmed. I saw him leave. He had another man with him who I thought was you. They didn't notice me—I had just come back inside—and Donwirel looked so grim that I dared not call to them. You know how he is when he's preoccupied. When they were gone, I came back here, thinking he might have left a note telling me whether to wait supper. Instead, I found you on the floor. I cried for Arva and she revived you. For that she shall have a hundred golden ewals." Rianna's laugh was shaky. "Cheap at the price!"

Her breathless explanation helped steady Owan; and merely looking at her, where she sat flushed beside him with both hands enclosing one of his, was like a renewal of blood. Still a trifle giddy, he laughed likewise. She started at the harsh cackle. "What's the matter, Owan?"

HE stared at the darkness in the window. "His plan was so good. Everything was thought of beforehand. But when the moment came . . . for action . . . he forgot to tell you to wait supper. On that rock he wrecked his ship."

"What do you mean?"

Mirth faded. He gazed so hard at her that she let him go and shrank back a little. He must gather all his courage to tell her.

Finally: "Best you hear this from me, here and now, my lady, and not from some stranger. Donwirel drugged me himself. He had an accomplice hidden in his study, dressed him in my uniform, and went off to the Holy."

She got so pale that he seized her in his turn. Her arms felt cold against his palms. "Oh, no," she choked. "You're wrong. Maruna would not let it be."

Owan's strength was returning in great strides, but he felt no joy of it. "Donwirel is a spy for Wir," he said. Each word must be dragged forth. "Now that Govandon's work is complete, Donwirel means to steal it and escape in a boat to the enemy."

"But—No," she begged him. The ghastliest part was that she did not weep, though her mouth was stretched out of shape with pain. "There must be a mistake. Donwirel . . . no, I've been Donwirel's wife for . . . a year—"

"He was Marchmaster of Isteth for ten years before that," Owan said. "A long ways from the capital. He could have been corrupted in his youth and no one hereabouts would be any the wiser."

Because his father had told him that gods and men must do what is right or become beasts and devils, Owan stood up. "I'd best go to the Holy at once," he said. "If I'm mistaken, we'll get the proof there, and nobody will be happier than me."

And a part of him distressed his father by denying this: by remembering that a guardsman who uncovered a dangerous spy might well get a patent of nobility and thus aspire to the hand of a Marchmaster's widow. He said resolutely, "I'll tell you as soon as I know," and started to leave.

"Wait for me!" she cried.

"My lady . . . you can't—"

"My grandfather was a king. Will you deny me, Captain?"

He stood bemused until he recollected that time was important. "Come, then," he said, and hurried out the door.

THE elevator engine seemed to chuff for a thousand years at the bottom of the shaft, before the cage came in answer to Owan's oathful command down the speaking tube. The operator bent his knee to Rianna and gaped at her escort. "I thought you was

with my lord half an hour ago," he said.

"Get this thing *down!*" Owan snarled.

By the time he reached the carriage level, the drug had so far worn off that he understood how urgent the case was. He brushed by his lady and ran down the ramp to the stables. A groom gave him a stupid look. "Saddle two fast ones," Owan snapped. "And where can I find a weapon?"

"Uh? A weapon? Why, uh—"

Owan shook the man till the teeth rattled in his head. "Something to fight with, by the gods!" Glaring around the antechamber, he saw a pitchfork stuck in a bale of straw. "That'll have to do. Get those brutes saddled!"

A shove sent the groom stumbling into the main room. From its darkness came a sweet mingled pungency, horses, hay, manure, feed, leather. One animal blew out its lips with a gentle noise, and Owan remembered how soft that muzzle was, and how the body in gallop would ripple between his thighs, hoofs would ring and the wind roar across sun-dazzled grassland miles—Why had the gods departed from a world so beautiful?

Rianna entered. She was still very white, her eyes looked washed out and she bore herself with unnatural stiffness. But she

said bleakly, "Perhaps he did betray his king. It looks as if he did. Then kill him for me, Owan."

He had no reply. They waited in common misery until the groom led out two gray geldings. He helped her mount and led the way up the ramp. Horseshoes clopped loudly, answered by hollow echoes. The thought flickered in him that he probably typefied some absurd philosophic principle: riding with a headache and another man's wife to stave off a half-imagined catastrophe with a pitchfork.

BYOND the carriage gate of Falconhome, Golden Way lay broad and nearly empty. Its harbor blockaded, Usant had little business to transact other than survival. After dark most folk sat in their apartments, few shops kept open, and only every third street lamp was lit, to save gas. Thus the avenue became a river of darkness, banked by sheer walls in whose upper heights windows glowed like the eyes of animals come down to drink. Stars were visible overhead, distance-dwindled and impersonal, upon a strip of deep-blue night. At intervals a cobra lamp post could be seen, the lantern in its jaws casting a wan glow on the bronze coils.

But time was short! Owan spurred his horse to full speed. The hoofbeats made a drumroll

which the blind arcades flung back. Night air flapped his tunic and sheathed him in chill. Occasionally he glimpsed other humans: a mounted watchman whose helmet wings gleamed in the murk, a robed burgher whose belly had begun to shrink, a pauper in rags who stared from an alley and mumbled that Wir at least fed the people. And behind him rode Rianna. But he had never felt so alone.

He burst onto the Sacred Way. Granite sphinxes, couching in gloom, seemed to bare fangs at him as he passed. Now ahead in its open plaza rose the Holy. Its walls cascaded down from the dome like a frozen fountain. On each side there was a god statue, fifty feet tall. Father Vedan guarded the east, gazing across the ocean to the savage lands beyond; the eagle on His wrist threw a monstrous shadow of wings. Shridnu, strong plumed warrior, bestrode His lion and looked north toward the glacial cap of the world. Youthful Kalivashtu tossed His long hair and laughed westward, hands holding up the cobra which gave His blessing to the mainland. But it was Maruna, Our Lady of the South Wind, Maiden and Mother, beneath Whose image Owan came galloping.

He didn't stop to bend his knee as he should. *You will understand*, he told her. *O heal the*

hurt in my love who rides behind me!

He reined in below the great staircase, sprang to the pavement and pelted upward. The entrance yawned black as the mouth of a devil. It dwarfed the two guardsmen who slanted their pikes across Owan's path. "Halt!" cried one.

He panted to a stop. "Let me by. Give the alarm. There are spies inside."

"What d'you say?" The man trod close and peered, a burly redbearded fellow whom Owan didn't recognize. The light from the eternal flame at Maruna's feet was dim up here.

"What d' you mean?" he asked. "Who are you, anyway?"

"Gods curse you," Owan yelled, "if you don't strike that gong I will!"

"No, you don't." The sentry caught Owan's wrist. The other man's pike lifted, aimed at the ribs. "You don't make a move, friend, till we've got the chief here."

Rianna arrived. "Let me by, you fools!" she demanded.

"Huh? Who're you?" asked the red guardsman.

"What? Why . . . I am—" She stared in astonishment. But she did look wild, Owan realized, with her robe disarranged and her hair in elflocks.

"Whoever you are, stay put till I fetch the chief," said the red-

beard. "Where is he, Conar?"

"Hm, I don't know for certain. Might be making the rounds, or might be down in the orderly room, or could even have ducked over to Madam Pwill's for a quick one. You'll just have to hunt for him."

IT WAS like a nightmare in which you fled from a monster but your feet were turned to lead. Owan struggled to awaken. *I will wake! These rule-bound yokels can't be real. . . . But Rianna said Donwirel's treason couldn't be.*

Convulsive as a tortured sleeper, he brought up the butt of his pitchfork. The redbear was cuirassed, but stood with legs braced wide apart. Owan clubbed him from beneath. His shriek echoed off the buildings across the plaza. As he collapsed, Owan twisted the fork and levered him in front of the other man's weapon. The pikehead grated on armor.

Owan stepped under the wielder's guard. His fist smashed into the face beneath the winged helmet. The sentry lurched backward. Owan hit him again, felt anguish lance through his hand, and knew remotely that he had broken a knuckle. No matter. The guardsman was sinking dazed to his knees.

Owan unshipped the battle ax of the redbear, who was still

horribly half conscious. Momentarily he wondered if any good could come from such a night's work as this. He straightened. "Strike that gong, Rianna," he said. "Wait here and explain when the reinforcements arrive. I'm going ahead. I think I know where they'll be."

He sped into the entryroom. By day this vaulted chamber was always astir with folk going into the sanctuary beyond for a moment of prayer or coming out with peace in their eyes. On festival days the entire ground floor of the Holy was crowded with colorful garments, flowers and music and exaltation. But tonight the room was a cave, scarcely lit by the candles before the god images. The mural of Shridnu triumphing over the storm devils was glimpsed as a malignant writhing; Maruna's girl caryatids leered from shadow. Owan ran.

An acolyte dozed at the elevators. He blinked to wakefulness when Owan snapped, "Ninety-ninth. Quick!"

"What? But . . . who . . . you can't—"

Owan brandished the ax. "I certainly can. Get moving!"

The acolyte wailed and scuttled into the cage. Owan stood behind him, hoping there would be no need to kill. The boy threw the Up lever, cogs engaged the endless cable, floor after floor

creaked by. The Level of Dwelling, the Level of Learning, the Level of Contemplation, the Level of Mysteries . . . Owan lost count. But on the ninety-ninth story Govandon had assembled the results of his work.

The cage jarred to a halt. "Very well, get down again," Owan said and leaped out. Already the gongs were booming, from floor to floor, and he thought he heard a distant shout of guardsmen.

HIS bare feet thudded down a malachite corridor, coldly gas-lit. At the end, he saw a door swing open. Donwirel came out. The nobleman bore a thick bundle in his arms, the papers of Govandon. (And no copies had yet been made, Owan recalled.) As he saw who came plunging toward him, Donwirel's eyes widened. "Get him, Tregwen!" he barked. "Fast!"

They might still escape in the confusion. If they got time. Owan poised, barring the corridor. The man who resembled him came out, ax aloft.

There wasn't a chance to be afraid. As Tregwen hewed at his head, Owan parried the blow. The force jolted his muscles. He sidestepped and his ax slithered past the other helve, to his enemy's wrist. But that was protected by a gauntlet. Tregwen grunted and tried to catch Ow-

an's haft with his free hand. Owan knocked that arm aside. He struck home. The blow clanged harmlessly on the cuirass. Tregwen jumped back.

For a moment they stood crouched, measuring each other. Thoughts ran like lightning in Owan: *He'll feint at my left shoulder, then chop for my legs, expecting his armor to protect his head.* It was a standard maneuver against an opponent without mail. Tregwen lunged. Owan ignored the feint and leaped straight in the air. The enemy ax whirled under his feet. Off balance, Tregwen spun half around. Owan saw the neck exposed and smote as he landed.

Tregwen had instantly hunched his shoulders. Owan's ax crashed on the helmet. A wing was lopped off and Tregwen staggered. But he remained alive. He brought his ax upward and blocked a second blow. Again they disengaged.

OWAN circled about. Tregwen turned with him, but heavily. He was shaken by the buffet on his helmet. Owan cursed himself for not making the obvious thigh cut when he had the chance, even though it wouldn't have ended the fight. He pounced, making a feint of his own at the face. Tregwen's haft blurred with the speed of parry. Owan's slash swerved in midair



and glanced downward. The brass strips hanging around the kilt were parted and the ax bit in the hip.

Tregwen grunted and cut at Owan's left leg. Owan blocked with his free wrist. Ungauntleted, he knew sickening pain when the helve smote. But he managed a short chop into the right arm of his enemy. Tregwen reeled back. His blood dripped bright on the floor. Owan pressed the advantage, striking and striking. Most of his blows were stopped, but some hit and some of those encountered flesh. There were few counterblows. Iron boomed and banged in the corridor. Breath came loud and harsh. The alarm gongs bellowed from below. Step by step. Tregwen was driven back.

When the last wall halted him, he struck wildly. Owan met that attack with the twisting defense that can pull a weapon from a man's hand. Tregwen's ax clattered across the marble. He stared stupidly before him. Owan struck at the neck. There was a meaty sound and Tregwen went on his face. Blood rivered from him.

...But I didn't need to kill him. I wasn't thinking. Gods Who created mercy, forgive me.

Donwirel!

Owan spun about with a gasp. The corridor was empty.

He must have taken the stairs.

Somehow Owan carried his feet to that door and down a spiral that clattered under his haste. The well was dim, rare lamps touched walls more dusty and faded than was right in this building, and the air was stale. Once, when he passed a window, Owan saw an owl flap from its nest.

O gods, if Donwirel has escaped after all!

Several floors further down, he met a squad coming up. "Halt!" they said. A crossbow trigger snicked. Wearily he dropped his wet ax and accompanied them.

LATER, as his daze lifted, he found himself being pushed into a room draped all in red. A black throne faced a niche where stood an image of Vedan in His stern aspect of Justice. Twenty watchmen posed rigid, axes in hand: not royal guards posted to this duty, like most of the temple sentries, but warrior priests, whose helmets covered their faces and had crests shaped like eagle's talons. One grasped Owan's arm, another held Donwirel—whose lips bent into a sardonic smile at his erstwhile escort—and a third waited beside Rian-na. Blackrobed and whitebearded, the Archpriest Govandon sat on the throne.

Only his eyes moved as Owan was brought in. "Close the door," he said. It shut with a massive

slowness that bespoke sound-proofing. The crimson drapes seemed to writhe before Owan like smoke. "Captain, the lady Rianna has told a tale which the Marchwarden denies. Now do you tell your story."

Owan looked at Rianna. Her own gaze never left Donwirel, and she trembled as she stood. Her husband appeared at ease, arms folded, continuing to smile as he regarded Govandon. The words came out of Owan as if a stranger said them.

There followed a silence.

After some fraction of eternity, an armed priest entered and related what he had found on the ninety-ninth floor. "And the dead man's armor, Lord Archpriest, was etched with the name of Owan, Glindir's son of Cardeu."

"It does not form part of your story, Marchwarden that was, that your guardsman lent anyone else his armor," Govandon states. No expression touched his features.

Donwirel raised his tousled head. "My lord," he said with pride, "until trial before my peers, with the regent as judge, has established guilt, I remain what I am. Pray address me accordingly."

The Archpriest's words fell like stones. "You are in the Holy, and crimes have been done here. The law gives me judgment."

Something went out of Donwirel. He wet his lips and looked toward Rianna. "My darling," he breathed. "You were the one who denounced me. But you can't have meant it. You were befooled. You don't want me to die. Go to Windspear. Get help—"

She clenched her fists so hard that the nails drew blood, but otherwise she did not move.

"I could bind you over to the regent for trial," said Govandon, "but what could he do save punish you? The gods never sought revenge."

ANOTHER while he sat, hardly seeming to breathe. Owan glanced back at Rianna and saw that she was watching him—him, Owan!—as if he were the last life in her world. His heart jumped.

Govandon said:

"You shall expiate your crime, Donwirel from Isteth. Do you remember why we have not yet called the gods?"

The prisoner's mouth opened and closed, but no sound came forth. His fear could be smelled across the room. When the silence grew unendurable, Owan ventured, "Is it not, my lord, that you're afraid you may raise demons instead?"

The old eyes gauged him for a space. Finally, "Yes," Govandon replied. "However, there is one way of summoning the gods and

only the gods. I have delayed, hoping to find another method equally certain. But now the need for that is gone. The means which seemed the most cruel has become the one most merciful."

Donwirel strangled on a moan.

"Yes," Govandon nodded. "You know."

Rianna nearly screamed, "What will you do?"

"You must do it, my lady." For the first time, pity touched the Archpriest's slow voice. "Harder service was never asked of the blood royal. Yet remember, this is his expiation and cleansing."

She snatched Donwirel's hand. It lay limp in her grasp. The prisoner was breathing quickly and loudly.

"As you must have gathered, my lady, our effort in this past year has been to rediscover those rites by which the ancients could call the gods to their aid," Govandon told her. "We have found only one rite which is unfailing. This we know of from unequivocal texts going back no further than the Bright Prophet's time. He put an end to all blood sacrifice. Yet even he distinguished between two sorts. There was the slaying of an animal, a helpless captive, or a criminal whom men were glad to be rid of. That was a demonic act, and those who answered its summons were more apt to be devils than gods.

"But there was another immolation, when a human being was slain by one who loved him. And that act would bring the holy ones Themselves, in Their infinite compassion, and They would grant the prayer which was so just and urgent that it overcame love.

"My lady, do you still love Donwirel?"

She threw her arms around the prisoner and shrieked, "No!" He embraced her and glared above her head at Govandon.

The Archpriest waited till her weeping neared an end, and then he said with enormous gentleness:

"I know the royal blood too well, Rianna. You could not live with a traitor, nor poison the heritage of your fathers with his. Secular punishment is meaningless and degrading. Can you not see, sacrifice is the one release you can give him, and give yourself?"

"The devils take myself," she shuddered, and strained closer against Donwirel. "No!"

Govandon's face congealed. "Then I must bind him over to the regent. The penalty for treason is savage. He may curse you before they let him die."

SHE turned her blurred eyes to the Archpriest, from end to end of the room like a caught animal, and finally back to Don-

wirel. Sweat poured down the prisoner's cheeks. "Take me away," he rattled. "Take me to Windspear. Rianna, you can plead for me. The regent is your own father. He won't—won't—"

She released him, took a step away, and halted. Owan started to go to her. A guard stopped him.

Slowly, her back straightened. She shook the hair off her brow. No more tears flowed. When she spoke, the words came toneless but altogether steady. "As you wish, Lord Archpriest. You are right."

"Well spoken, my lady," the old man said.

"Only . . . let it be done now. I do not think I would be able to do it tomorrow."

Silence fell anew. The steel-masked warriors tautened where they stood. Owan felt sickness in his belly. *Can this indeed be the way? someone gibed. How can death, any death, summon the gods from Their universe of universes? How can we bid Them destroy Wir's men, who are living human creatures?*

Then Govandon struck the throne with his fist and cried: "Why not? All else is prepared. The rituals have been rehearsed many and many a time. Why should the gods not come to deliver us this very night?"

Donwirel made a choking noise and sagged into the guard's arms.

THEY had bathed and robed Owan and brought him to stand beneath the dome of the Holy, feeling that he had earned the right to see the advent. But for the gods he cared nothing. There was an ashenness in him. He was here only that Rianna might have one friend to take her home.

The floor gleamed blacker than the night sky, inlaid with jeweled symbols of wisdom, love, and mystery. The air was thick with incense. Owan's weary head spun. He scarcely followed the chanting of the hundred-man choir, it came to him like a noise heard in dreams, and Govandon's prayers at the altar had the humming quality of fever. Dim was the mass of the priests, save where gold and steel glistened, and more remote than the stars were the lit windows in other towers where folk carried on their unsuspecting lives. At each quarter of the dome, silhouetted against night, was a statue: Eagle's wings and beak, rampant Lion, hooded Cobra, and the Rose. Starlight fell through the crystal, arrow sharp.

They had let Rianna, veiled and voiceless, stand beside Owan. Her fingers were cold in his. Never before had he understood what a weight to bear was royalty.

And yet, said the devil in him, royalty, like priesthood, must not only be dutiful. It must be wise.

But when a tyrant's ships prowled about the last fortress of the king, what was wise?

A trumpet sounded, one icy note that clove the chanting, and they led forth Donwirel. He stumbled as if blind. They laid him across the altar. Rianna went from Owan on the second trumpet call. She knelt while Govandon cried the final prayer, the ancient and clangorous prayer which Cuedd had uttered against the heathen. Rising like a machine, she took the knife he gave her. It was black and invisible from where Owan stood. She stooped in the light of the few candles and kissed her husband farewell. He lay passive, already forsaken by his own will. A third trumpet rang. Rianna lifted the knife and brought it down.

Blood ran over the altar, which housed the bones of the Bright Prophet.

Her face alone did not lift toward the sky.

THERE was no sound at first. Those Who came outran sound. But when the wind of Their passage struck, the noise roared louder than bursting mountains. The Holy and all the towers of Usant swayed. Windows smashed and glass flew in daggers. The crystal dome held, but suddenly its surface was crazed, so that the stars could not be seen.

GOODBYE, ATLANTISI

Those who had come were still discernible. Not Vedan with the awesome face of justice, nor Shidnu the evilsmiter, nor laughing Kalivashtu, nor Maruna. Lurid as suns in heaven there glowed four naked brains.

Heads of bronze housed them, rigid scornful faces and blind eyeballs. But the skulls were open to the brains, which pulsed and burned, larger than moons, lightning playing over each wrinkle; and out of the bodiless flying heads there poured a yellow radiance. From horizon to horizon that light shone, viciously brilliant, so that Owan thought in his staggering mind he could count the houses on the mainland shore and the waves on the waters. Then the thunder of advent struck the sea and turned it wild, and houses began bursting into flame.

Owan did not know what unlocked his muscles. He left the screaming crowd and ran across the floor, toward the altar, shielding his eyes from the light but never taking them off huddled Rianna. Close by, he could hear Govandon call out, where the Archpriest stood by the corpse on the altar with electric sparks crawling in his beard: "Their aspect—the aspect of vengeance—surely They need not reveal Themselves in human form—see, see, Their force has lifted Wir's ships into the air, oh, see how

the ships are dropped and burst asunder! The wrath of the gods is raised against our foeman!"

Owan hauled Rianna to her feet. His clumsy haste tore the veil from her. She stared numbly at him. "Get up! This way!" he said through the tumult.

"The gods, the gods have come," she wailed.

"I don't give a curse! No good can come of what was done tonight. I'm getting you out of here!"

He picked her up and ran toward the door. Most of the priests were on their faces, adoring the brains. One guard, shocked at Owan's blasphemous flight, cut at him with an ax. Owan kicked, caught the helve in midswing, tore it loose, and boot-ed the man aside.

In the anteroom he found one elevator shaft empty. The cables were snapped and the cage had fallen. He stumbled into another, dumped Rianna on the floor and yanked the Down lever. As they descended, the cage swayed and bounced, struck the shaft wall, tilted, shivered, and echoed with the groans of the building.

Rianna seized Owan by the shoulder. "Are you gone insane?" she yelled. "The gods are here, Wir's fleet is destroyed, and you run from Them! Take me back!"

He said harshly, "I don't think the gods should endanger inno-

cent folk too," and shook her off. When they were on ground level, he must drag her by force out into the street.

But there she screamed.

THE sneering heads hung low above the Holy. Even as Owan watched, the dome shattered. Crystal poured earthward, an avalanche of shining knives, mingled with broken things that had been men. The walls cracked open.

Then she fled with him, along streets that heaved and split underfoot. Once a tower collapsed behind them and bricks whizzed and bounded past. The racket filled their world as did the unmerciful yellow blaze. They passed other people, a few who stumbled lunatic with horror, more who lay beneath fallen pillars or broken statues. But there were not many. Most had been trapped in their upper-level homes.

A horse galloped mad through the street. "What can we do?" Rianna sobbed. "Where can we go?" The ground shuddered and she stumbled into his arms.

"The waterfront," he clipped. "Now that the enemy ships are gone, the sea will be safer than the land."

A tower was lifted bodily. They saw it fly through incandescent heaven, breaking in pieces that rained on the city.

Somehow they reached the docks. The smoke of burning ships and warehouses made the air dense and acrid. Nonetheless Owan spent time investigating each boat he found. He needed one big enough to cross the ocean but not too big for him and her to sail. There should be dried food and fishing tackle in the lockers and a cistern to catch the rain water he could expect at this season. Eventually, with the pier splintering beneath him, he came upon one such. With Rian-na's help he cast loose and hoisted the mainsail. A hot wind raged through the narrows. He ran before it to the island's end, put the tiller over and beat eastward into open sea.

Only then did he dare look back. The heads had abandoned Usant for a time and gone over to the mainland. As far as he could see, the kingdom seethed with flame. But even as he watched, the fires were quenched, for the land was slowly sinking into the ocean. He reflected grimly that the surge would give him a good strong boost on his own course.

THE noise was now so distant that he could hear Rianna. "Owan, Owan, they were mistaken. Govandon, the priests, everyone was wrong."

"Indeed they were," he said through tightened lips.

"Those were not gods they summoned. They raised devils instead. Devils that feed on destruction . . . that had not been called or fed for a thousand years . . . whose hunger was grown so great that they devoured everything, everything—" She lay down in the hull and wept.

That was well, Owan thought; for thus she did not see the heads return to Usant, pick up the entire island and drop it in Morwen Deep.

That raised such waves he was kept blessedly busy for a space. When at last the boat was safe and he could look again, the burning brains were gone. There was an enormous quiet. Darkness lay on the sea, save for the tiny stars. He steered toward the sunrise that was still many hours away.

Presently Rianna crept to him and sat at his feet. He caressed her hair. She caught his hand and clung. "We raised the hungry devils," she whispered. "Owan, Owan, can the gods ever forgive us?"

"We didn't know," he said practically. "You and I. The fault is scarcely our own. Perhaps no one's." He paused. "But our land and our people are drowned all the same. I think . . . when we reach the other shore . . . we can teach the wild folk somewhat . . . in memory of our land." (cont. on page 45)

BATTLEGROUND

By WILLIAM MORRISON

Snatching an appendix neatly and efficiently was Doctor Verner's dish, so the operation appeared to be entirely routine. But this particular patient was constructed along strange lines. He needed his appendix very badly!

IF VERNER hadn't been a butcher as well as a skilled surgeon, thought Dr. George Larkin some time later, the strange appendix would never have come to light. And if he hadn't been a butcher, Larkin might have added, Verner would have lived longer. But that fact neither man had any way of knowing at the beginning.

There had been a shortage of operable patients that day, in both wards and private rooms, and Dr. Verner's fingers were itching to remain in practice. And the black-haired white-faced man the nurse had just wheeled in was made to order for a diagnosis of appendicitis.

"Temperature?" asked Dr. Verner.

"One hundred four point

eight," said Martha Johnson, a newly graduated nurse who aroused Dr. Verner's less surgical instincts, and made him regret her own lack of interest in him.

Verner grunted with satisfaction. "Blood count?"

Miss Johnson handed him the result of a test, and he nodded happily. The white corpuscle count was extraordinarily high. This had all the earmarks of a severe case.

But if Verner was a butcher, he was a careful one. He had already examined the man once. Now his hands moved again over the almost unconscious man's abdomen, pressing a little more roughly than was necessary. The man groaned, and once more Verner grunted happily. The abdomen was stiff as a board,



and must have been as painful as a giant boil.

"We'd better operate at once," decided Verner. "How about a release?"

Miss Johnson hesitated. "I'm afraid there's a little trouble there," she admitted. "He collapsed in the street, and was brought here in an ambulance. We don't know his name."

"No papers on him?" demanded Verner incredulously.

"No, Doctor."

"I won't operate without a release," said the surgeon, his manner suddenly righteous. "I've been accused too often as it is of cutting out perfectly healthy organs."

"Of course, Doctor," said Miss Johnson soothingly.

The man on the table stirred. His eyes remained closed, but his lips could still form words. "Peter James," he muttered thickly.

"You're Peter James?" asked Verner.

A nod answered him.

"You need an emergency operation for appendicitis, but I can't help you unless you're willing to sign a paper releasing the hospital from responsibility if anything goes wrong. If you don't sign, and I don't operate, you'll be finished. Will you sign?"

The patient muttered some-

thing that might have passed for, "Yes."

A sheet of paper was thrust before him, and Miss Johnson's arm supported his shoulder as his hand weakly grasped the pen. He signed.

Dr. Verner sighed, and went to work.

Dr. Verner could have snatched an appendix in the dark, and very often did, making as short an incision as he could get away with, and letting his fingers do the work with almost no aid from his eyes. This time he hardly noted the shape of the organ he removed—he had seen so many of them, of all shapes and sizes, that he paid little attention any more, except to check on whether or not they were inflamed. This one was. That was all he wanted to know, and he went on to the next patient.

Miss Johnson, on the other hand, had seen very few appendices. She was impressed by the shape of this one, and instead of tossing it out, kept it in a bottle to show Dr. Larkin when the latter made his rounds. Dr. Larkin was only a few years out of medical school, and he still believed that he might be not only a physician, but a scientist as well. It was a delusion that

the hospital had not yet been able to discourage.

He stared at the excised organ and said, "That's no appendix. Too short and thick."

"They come that way sometimes. Dr. Verner said so."

If Dr. Verner said so, the ethics of his profession permitted no contradiction on his part. They also permitted him no opportunity to examine a patient under the care of another physician, unless that physician or the patient himself requested his care. And this patient was in no condition to request anything.

But there were ways of getting around that. He sought Verner, as if casually, and said with a respect he didn't feel, "Hello, Doctor, how's the golf game these days?"

"Good," returned Verner, who prided himself on his athletic ability. "It could be better, though, if I had more chance to practice."

"Looks like a nice day for playing."

"I have these patients—Doctor, would you do me a favor and keep an eye on them for the afternoon?"

That was what Larkin had been fishing for, and he assented heartily. A few moments later, he was examin-

ing the appendicitis victim, who had come out of the ether, and was now sleeping peacefully.

"Temperature down, white count very low, abdomen relaxed—he hardly seems sick."

"Dr. Verner operated just in time," said Miss Johnson.

"Or else," thought Larkin, "no operation was necessary." He said aloud, "Let me have that appendix."

Miss Johnson handed it over, and he sectioned off a thin slice, which he examined under the microscope. He turned pale at what he saw, and sliced off another sample of tissue.

"What is it, George?" He looked at Miss Johnson, and she colored. "I mean, what is it, Doctor?"

He hadn't even noticed that she thought of him as, "George." His face was shining with perspiration, while his eyes stared unhappily at her. He muttered, "It's a joke of some kind."

"What's that, Doctor?"

"I said that Dr. Verner's trying to play a joke on you. Do you know what's in this so-called appendix? Gray matter. The same stuff you'll find in the brain, with the same convolutions and the same general structure. This thing was no appendix."

"But I saw Dr. Verner take it out himself, Dr. Larkin!"

"You'll swear to that?"

"Of course I will," she said indignantly. "Besides, how could it be a joke? Is any part of the human brain shaped like that?"

Larkin's eyes narrowed. "You're right, it isn't. Nor is any animal brain that I know of. Miss Johnson, I think that this man had better have a few X-rays."

Later, when they had the plates and examined them together, Larkin seemed sicker than the patient. "It's hard to believe," he muttered at last. "Peter James has two extra ribs and an extra stomach. His heart's on the wrong side. He lacks kidneys and gall bladder—and no human being can live without at least one kidney, or live in very good health without a gall bladder. He has a regulation skull, and one fairly normal brain. But he seems to have had an extra brain in his abdomen. In addition, the bones in his arms and legs make liars out of all my professors of anatomy. Miss Johnson, no matter what this man looks like, he isn't human."

"Then what is he?"

"I don't know. He can pass

himself off as human, and no one would have noticed the difference if Verner hadn't been so crazy about operating. He probably had some disease peculiar to his own type, and it simulated the symptoms of appendicitis. Obviously, the symptoms would have passed away if there had been no operation. Cutting him open just delayed his recovery."

"I wonder," said Miss Johnson, turning a little pale on her own account.

"You wonder what?"

"Whether there are any more like him around. And if they are, what they're doing here."

They were silent for a moment. At last, Larkin admitted, "I was wondering the same thing, Martha, but I didn't like to put it in words. I'd like to observe this patient."

"Certainly, Doctor. Incidentally, do you usually think of me as, 'Martha'?"

Dr. Larkin flushed. "It's a bad habit I find myself slipping into, Miss Johnson. I'll try to cure it."

"Don't bother," she advised. "Try to be like the other doctors—so busy watching the patients that they haven't time to care about curing themselves."

"The patients and the nurses."

"Just the patients and this one nurse," she said firmly.

It turned out to be just one patient, at that. The physical recovery of Peter James was completely uneventful, but his mental reactions offered features of interest. He seemed to be alert enough when Larkin chatted casually about the weather that day, or about the terrible state of the world, but his face showed confusion when the conversation turned to himself. He remembered his name and the place he lived, but little more. He spoke as if his previous existence had been a dream, and he didn't know what he did for a living, or what had happened before he had his attack of illness.

They checked at the address he gave. He had hired a room the very day he was taken to the hospital, but he had not yet brought his baggage along, and the landlady knew nothing about him, except that he had enough money to pay for two weeks' rent in advance.

"For a human being, it would be a strange form of amnesia," observed Larkin. "Amnesia victims usually have a subconscious anxiety

to get out of themselves, to shake off their previous identities, and as a result, their names and addresses are usually the first things they forget. But for a non-human creature who's had some brain matter removed, it would be a perfectly logical reaction."

"If he isn't human, then Peter James can't be his real name."

"Right. Martha, I think it's time we found out whether or not there are any more like him walking around."

"How? X-ray every one in town?"

"Not quite. Just every one, say, in the B. & L. Steel Co., as a fair sample."

"The B. & L. Company employs ten thousand people."

"With the new mass X-ray system, we can snap a shot quickly for less than a cent per film. And as every B. & L. employee, from the president on down, punches a time clock when checking in, we can label every film with the right number, and identify any non-human individual we find."

"It doesn't sound like an easy job," she said doubtfully.

"All we need is cooperation from the right B. & L. official. We can arrange to have them automatically snap them-

selves as they punch the clock. The only thing I'm uncertain about is the official to go to. Suppose the one we picked was a creature like Peter James?"

"Dawson Hartnell, the Treasurer, isn't."

"How do you know?"

"He was at the hospital last month—one of Dr. Goldsmith's patients. And I remember that he was X-rayed. He wouldn't have taken a chance if he weren't human."

"Good, Martha, I'll try him."

Dawson Hartnell, a paunchy official who had served as treasurer for so many years that he thought of everything in terms of slashed budgets, was at first doubtful. But Larkin spoke convincingly. He was conducting a research survey on industrial workers, at his own expense. The results were for his own use, and the name of the company would not be published. If he came across any cases that showed dangerous illness, he would turn the names over to the company, so that treatment might catch the disease at an early stage, and save the company money in compensation insurance. As he presented it, the company had nothing to lose and something very definite to gain.

Eventually, Dawson Hartnell shrugged. He wanted to be assured that the whole thing would be kept secret, for the men, and more especially the officials, of the company would have resented being examined without their knowledge. Larkin was only too glad to give him the necessary assurances, and even gladder that he himself hadn't been forced to suggest it. Secrecy was essential

He set up his apparatus at the main gate one night after the men had checked out. The plant was working only a single shift, and the few guards who were about had no opportunity to find out what he was doing. The next day's X-rays brought no results, and he shifted the apparatus to another time-clock and then to still another. By the end of the week, he had spotted several cases in need of treatment, but not a single skeleton that wasn't human.

The Q. & Z. Body Parts Corporation was next on the list, and here, operating with the aid of the President himself, Larkin had better luck. One X-ray out of the five thousand showed a non-human skeleton. The man who possessed it was Ernest Littlefield, one of the Vice

Presidents. Littlefield was in his thirties, a suave sharp-featured man whose black hair and pale face reminded Larkin of Peter James himself. His rise in the company had been rapid, and it was generally agreed that he would go very far indeed.

Larkin studied the X-ray photograph and said gloomily, "Well, we've found one, and there are probably others around. What do we do next?"

"Get the police," suggested Miss Johnson.

"Why? So far as we know, Littlefield hasn't committed any crime. There's no law against having an extra stomach, or lacking a gall bladder."

"There's nothing else *we* can do," pointed out Miss Johnson logically. "The police might think of something."

"They might think of having us committed for observation," he returned. "What we have to do is find out what Littlefield and James, and any others like them, are up to. Where did they come from, and why are they here? And just what is the function of that extra, abdominal brain?"

"If only Dr. Verner hadn't operated on James, we'd be able to see for ourselves."

"If he hadn't operated,

James wouldn't have stayed here. We'll try asking him again anyway. Perhaps if we suggest different possibilities to him, we may be able to strike a familiar chord, and a few things."

The patient was ready to leave his bed now. He was, in fact, almost ready to leave the hospital. Larkin knew that fast action would be needed, and he was relieved to find that Verner was not around to interfere.

Larkin began casually. "Do you remember the name you had in those dreams of yours, Mr. James?"

"Peter. Peter James."

"Not that. The one you used on your home planet."

James looked puzzled. "Did I say that I had come from a different planet?"

"You came from one in your dreams, didn't you?"

"I remember vaguely—there were instructions—"

"Now you're getting it! What were your instructions?"

"I think I remember." He looked coldly at Larkin. "The chief thing was—under no circumstances to talk about them."

Larkin laughed, as if they were cosily sharing a secret. "It's nonsense to take a dream *that* seriously. What else?"

"I'm not supposed to talk.

"How many were in the group that was sent here?"

"I'm not supposed to talk."

Larkin began to perspire. "You'll never stop having these dreams until you get them out of your system. It's a therapeutic measure."

"No, you can't fool me. They aren't dreams. I remember now—" He stopped talking abruptly.

Larkin exchanged glances with Miss Johnson. The man's memory was coming back, partly because of their prodding. And that meant that many of the strange powers that were connected with his peculiar nervous and anatomical system might also come back. If that happened, and James suspected what they were doing, before they had obtained any useful information, it might be a sad story both for them and for the rest of humanity.

Larkin rose, and forced a smile. "If you don't want to talk, no one will make you. Come along, Miss Johnson."

Outside the room, he asked, "Does he receive any medication?"

The nurse shook her head.

"Then I'll have to prescribe some. Do you think, Martha, that you can get a shot of

scopolamine into him without arousing his suspicions?"

"I'll manage. But Dr. Verner will be angry."

"Verner won't be around tonight until fairly late. And he won't know. If James were a human being, I could be accused of behaving unethically, but he isn't, and under the circumstances, I think I'm justified."

"I think so too, George. I'll give it to him."

Larkin was near sweating blood while she went into the patient's room and he kept an eye on the corridor outside. But she came out a moment later, and nodded, and said, "No trouble at all. I told him it would help his recovery."

"Good girl, Martha. Now you'd better take over out here, stay on guard while I question him."

"But I want to hear what he has to say. And I can take shorthand notes."

"Not a bad idea. Come on."

The man's breathing was heavy and labored, and Larkin wondered how his non-human physiology would react later to the dose of drug. But the mental reactions were the important thing now, and he had no time to waste before learning what they were. He demanded, "Your name."

"I cannot tell."

Larkin's heart sank. Even the so-called truth serum hadn't been able to overcome the stranger's inhibitions on that score. But he professed a confidence he didn't feel, and went on.

"Your task?"

The answer came monotonously, "I cannot tell."

"Your destination?"

This time a positive answer came, though slowly and almost incomprehensibly. "Xanl."

"Repeat that in your new language."

"Earth."

There seemed to be no inhibitions in telling what his enemies were already supposed to know, and that might be important. Larkin asked, "For whom must you watch out?"

"For the Narians."

"Are they of Earth?"

"No. From the outer planets."

Larkin was encountering no inhibitions now, and he pressed his advantage. "Is it possible to win over the Earth people as allies?"

"Silly."

"Why is it silly?"

"Too inferior. Worthless one way or the other."

Larkin mopped his brow

at that one. He said, "Are the Narians inferior too?"

"In some ways. But they are a difficult foe to conquer."

"If the Narians come from the outer planets, why are you here?"

"I cannot tell."

They were back to that again. Larkin, "Do you come from one of the inner planets?"

"I cannot tell."

"That probably means that you do. What is your purpose here? To see if the Narians are setting up bases?"

There was silence.

"To set up your own bases?"

Silence again.

"If the Earth people are worthless, why were you instructed to maintain silence among them?"

Unexpectedly, the answer came. "So that the Narians might not learn."

"Then there are Narian spies here too?"

No answer. Larkin asked a loaded question: "What do they look like?"

"Earth creatures, if here."

The thought that the Narians might be on Earth too was a little too much for him. Not one alien form, but two, had invaded Earth. And neither of them regarded the planet's inhabitants highly.

"Suppose you and the Narians clash here. What will happen to the people of Earth?"

The stranger's eyes closed. Larkin turned toward Martha, and said, "He doesn't really have to answer that one. We can guess readily enough. We're considered too worthless to worry about. No matter which one's group is trying to establish bases here, the Earth, which has been temporarily neutral territory, will be turned into a battleground. They'll really do their fighting here, and wipe us out without compunction."

"But what can we do, George?"

"Somehow or other, we'll have to let the police or government know. We'll have to think of a way of approaching them so that they won't consider us crazy." He pondered for a moment. "The executive board is having a budgetary conference here tonight, and Dr. Martingale will be present. He's respectable and important enough. The police should take his word, especially if it's backed up by the word of his committee."

"And how do we convince Dr. Martingale?"

"Do this. Bring him the

X-ray plate we made of James. Don't tell him how we got it, but indicate that it was made by mistake. Let Martingale see that you're greatly disturbed—as you must be to come barging right into the middle of his committee meeting. Show him the plate without doing much talking. The best thing would be to gasp, and just point to it. If those extra ribs and stomach don't arouse his interest as a surgeon, I'll eat the thing."

"He'll say it's a mistake. He'll laugh at me in front of all those people."

"Of course he will. But in doing that, he'll call *their* attention to it. Then you can tell him that there isn't any mistake, because this is a duplicate plate, and it checks with the first one. If I know Martingale, he'll want to put an end to your nonsense by having another plate made under his own supervision. Once he examines James himself, we'll have him sold."

"All right, George, I'll do it."

"I'll stay here with James. Maybe I can get something else out of him after all."

He kissed her before she went, and Martha Johnson said blushing, "Don't, I

have to keep my mind on what I'm going to tell them."

Then she was gone, and Larkin turned back once more to the heavily breathing stranger on the bed. But this time none of his questions received an answer. The stranger's eyes remained closed, and he showed no interest in anything Larkin said.

Larkin leaned back in his chair and nervously lit a cigarette. There were a great many aspects of the case that worried him—what Verner would do when he learned that a colleague had distrusted his diagnosis of appendicitis, what James would do as his mental faculties returned, what the alien visitors would do when they realized that the people of Earth were aware of their presence and were instituting a mass hunt for them.

There was one thing that he failed to wonder about, and that was what Ernest Littlefield would do when he opened the door and walked quietly into the hospital room.

Larkin started to leap to his feet, but he wasn't out of his chair before the other man was next to him, moving so fast that Larkin's eyes caught only a confused blur.

A hand hit Larkin carelessly in the chest and knocked him back into the chair again.

"Don't try to get up," said Littlefield pleasantly. "Our reflexes are much more rapid than yours. I don't often have a chance to show them, but I think you could stand watching a demonstration."

He stared curiously at the man in the bed. Larkin said nervously, "He's been operated on. Appendix removed. Not by me."

"I wondered what had happened." Littlefield turned his back to Larkin, and bent over the patient. He spoke softly, making sounds that were unfamiliar to the physician, and the sick man's eyes opened.

Larkin stood up, as he thought, soundlessly, and took a step toward the door. This time Littlefield was not so gentle in knocking him down. He said, "I told you that I can move more rapidly than you can. You'd better believe me." And he added, casually, "You made enough noise to wake the dead. It may interest you to know that I have several senses that you lack. That's how I realized what you were doing at the plant. I can see by X-rays. And when I saw them aimed at me, I took the trouble to investigate."

Larkin was silent, as Littlefield turned back to the man on the bed. Of course, he thought, he might have known that the man could move faster. With a second brain to control the different lower body reflexes, the neural impulses to and from the leg muscles, for instance, would have half the distance to travel as in a human being. No wonder the alien could start into motion so suddenly. If that second brain were out of the way—

Larkin shook his head and shuddered as he suppressed the thought. Littlefield had said that he possessed senses which human beings lacked. He wondered if telepathy were among them.

But Littlefield gave no sign of being interested in reading his mind. He was questioning the man on the bed, and after a time James sat up and began to dress in clothes that had been hanging in a closet.

Littlefield said, "There was a nurse with you when you set up those X-ray machines. How many others know?"

Larkin's heart leaped. So they *couldn't* read minds. In that case he might be able to fool Littlefield into thinking that the police were already warned. For the question was obviously one of life and

death. If the secret belonged only to Larkin and one nurse, then it could be preserved by getting rid of those two individuals. If he could convince Littlefield—

Littlefield smile. "You can't. We don't read minds, but we know you humans well, and we can read expressions. I'm sorry. We have no more moral compunctions about killing you than you have in killing your cousins, the apes, but we don't destroy wantonly. So we'd like to limit the deaths to two. You have already inconvenienced us. We can afford no more interference."

And then, unexpectedly, the interference came. The door opened, and Dr. Verner stared at them. He demanded, with an expression of outrage, "What the devil is this fellow doing with my patient?"

Littlefield's reflexes were a marvel of speed. He had a tiny object in his hand and had pointed it at Verner before the latter had so much as realized that his life was in danger. The surgeon's expression had no chance to change before he sank to the floor.

Larkin had been using that limited human brain of his which the other fortunately couldn't read. Even as Little-

field killed the intruder, the young physician's foot caught the stranger in the abdomen, directly over the appendix-like brain.

The look of surprise on Littlefield's face was something to see. His legs seemed paralyzed under him, and the deadly little instrument he had been holding fell from his hands. Larkin picked it up, and almost at the same time grabbed a roll of adhesive tape. He taped Littlefield's hands to his sides and his feet to each other. He said grimly, "I'll admit that my own reflexes are nothing like yours, but for a human being's, they're not bad. And fortunately, I don't have my brains exposed to kicks in the stomach."

Littlefield shook his head ruefully.

"This is the first time I've been surprised by a human."

"It may not be the last. Miss Johnson, the nurse who was with me, has informed several people of your friend's anatomical peculiarities. The news may already have been relayed to the police. We may expect a delegation presently, and I think that they'll be pleased to find an extra specimen to investigate, with

second brain intact, and conveniently at hand."

"So it's useless to try to preserve secrecy."

"Yes, your killing of Verner didn't do you any good. And it may supply us with additional information. I don't know what effect your weapon had on him, but the autopsy should be interesting."

This time Littlefield seemed to mutter to himself in his own strange language. He caught Larkin looking at him, and said, "Sorry, I'm not being very polite. We have a proverb—yes, even in as advanced a civilization as ours, we still remember proverbs—to the effect that a levron—that's a strange animal something like a cross between a wolf and a seal—a levron does not querex—that is, look behind—for fear of vremon—learning the truth."

There were sarcastic overtones to the long-winded explanation, and suddenly Larkin sensed why. But it was too late to follow the suggestion of the words and look behind him. A blow smashed down on his head, and with it came blackness.

When he awoke, there was a pounding in his eardrums. After a while, he realized that it came from the door,

which was barricaded by the bed. The strips of adhesive that had bound Littlefield were on the floor, and both strangers were standing near him. Littlefield observed, "It may interest you, as a physician, to learn that in case of damage, some of the functions of the abdominal brain may be taken over in time by the cranial organ. My friend has recovered to a greater extent than you realized."

He spoke as if unaware that the pounding on the door was increasing in volume. Larkin put his hand to his ears, which were hurting him. He said, "They'll be in soon—and the secret will be out. You've lost."

"Yes, we've lost. Not that we're afraid of you Earth dwellers—although you have shown more ability to fight back than we expected—but once the Narians know what we're trying to do, our mission is a failure. And it's as much due to that fool there—" a nod of his head indicated Verner's body—"as to you. Well, he's had his reward. Personally, I'm not too much disturbed. The war may destroy us both, when it comes and now that we have to find another battleground, it will have to be postponed."

The door began to splinter. Littlefield smiled, and said, "In a way, you may have done us a good turn. But some of my friends may not see it that way, and those people out there are fortunate in that we don't kill wantonly." He turned to James and spoke in the strange unearthly language. James nodded.

The door crashed in, and the two strangers leaped forward. Larkin could follow the movements of James fairly well, but the other stranger was lost to his sight. He could hear screams and thuds, and he did see the body of the distinguished Dr. Martingale sail through the air, hit a wall, and bounce to the floor. He could see other bodies perform unexpected acrobatic feats before collapsing. Then he could hear contradictory, screamed orders, and the sound of running feet. Seconds later, he could feel the shaking of the building, and the rumble of a shattered roof caving in, and then a streak of light dazzled his eyes as it shot toward the heavens.

When things quieted down a little, Martha Johnson was sobbing in the doorway. "George, are you all right?"

He nodded. "I have a headache, but Verner has something worse—"

"Those creatures—"

"They've gone. At least some of them have. Whether they've left others behind on Earth I don't know. But from what Littlefield said, I don't think we're going to be a battleground after all. Not yet, at any rate."

"But what in case they come back?"

"We'll try to make sure that they don't. And now that we're warned, we'll succeed, even if we have to set up an X-ray machine on every street corner, and fluoroscope every man, woman, and child on Earth, if necessary. We'll keep them out."

"Darling, if not for you—you've been wonderful!"

"I can say as much for you, Martha. From now on—"

He was interrupted by the public address system, which

was blaring, "Dr. Verner! Dr. Verner!"

"They don't know yet that he's dead," said Larkin soberly.

"Emergency call for Dr. Verner!" grated the loud speaker.

They looked at each other, and Larkin said, "Martingale has been knocked unconscious, and there's no other surgeon around. I'll probably have to take over. And I give you one guess as to what the operation will be."

The guess was a good one. But despite the strain on his nerves, Dr. Larkin did his cutting with instruments that hardly trembled, although, when the operation was over, both he and Miss Johnson breathed a sigh of relief. It was a real appendix, this time.

THE END

(cont. from page 29)

"Teach them what was done this night?" she shivered.

"No, surely not. Rather teach what the Bright Prophet did. The destroyers are sated now. They've gone home. And . . . since they only came when summoned . . . I don't think they are able to come unless called. They were so hungry after a thousand years of waiting—maybe in ten thousand years they'd starve to death. We'll do what we can."

She didn't answer in words, but she kissed his hand.

He grasped the tiller with his other hand and looked bleakly

past sail and bowsprit to the eastern edge of the world. *Let her never be told*, he thought. *Let her believe that Govandon blundered and raised devils. I can spare her this much: the fact that the Bright Prophet was a fool and that I, preaching his words to the savages, will be a charlatan.*

For I do not see how there could have been a mistake. I believe that we did bring to earth the veritable gods, Vedan, Shridnu, Kalivashtu, and Maruna, They Who for Their own purposes made the universe.

THE END

HANG HEAD, VANDAL!

By MARK
CLIFTON

*Arrogantly, they set out to destroy a planet for
the good of Man—Man who is stuffed with straw
where his heart and mind and soul should be.*

ON our abandoned Martian landing field there hangs a man's discarded spacesuit, suspended from the desensitized prongs of a Come-to-me tower. It is stuffed with straw filched, no doubt, from packing cases which brought out so many more delicate, sensitive, precision instruments than we take back.

None knows which of our departing crew hanged the space-

suit there, nor exactly what he meant in the act. A scarecrow to frighten all others away?

More likely a mere Kilroy-was-here symbol; defacing initials irresistably carved in a priceless, ancient work of art, saying, "I am too shoddy a specimen to create anything of worth, but I can deface. And this proves I, too, have been."

Or was it symbolic suicide; a

Illustrated by FINLAY





sense of guilt—so overpowering that man has hanged himself in effigy upon the scene of his crime?

Captain Leyton saw it there on the morning of final departure; saw it, and felt a sudden flush of his usual stern discipline surge within him; all but formed the harsh command to take that thing down at once: Find the one who hanged it there: Bring him to me!

The anger—the command. Died together. Unspoken.

Something in the pose of the stuffed effigy hanging there must have got down through to the diminishing person inside the ever thickening rind of a commander. The forlorn sadness, the dejection; and yes, he too must have felt the shame, the guilt, which overwhelmed us all.

Whether the helmet had fallen forward of its own weight because the vandal had been careless in stuffing it with too little straw to hold its head erect—vandals being characteristically futile even in their vandalism—or whether, instead of supposed vandal, this was the talent of a consummate artist moulding steel and rubber, plastic and straw into an expression of how we all felt: no matter, the result was there.

The Captain did not command the effigy be taken down. None others offered, nor asked if that

might be his wish—not even the ubiquitous Ensign perpetually bucking for approval.

So on an abandoned Martian landing field there hangs a discarded spacesuit—the image of man stuffed with straw; with straw where heart, and mind, and soul was intended to be.

AT the time it seemed a most logical solution to an almost impossible problem.

Dr. VanDam summed it up in his memorable speech before the United Nations. If he were visually conscious of the vault of face blurs in the hushed assembly, this lesser sight did not obscure his stronger vision of the greater vaulted mass of shining stars in black of space.

He may not even have been conscious of political realities which ever obscure man's dreams. First, what he said would be weighed by each delegate in terms of personal advantage to be gained for his own status. Second, his words must be weighed again in terms of national interest. Third, what advantage could be squeezed out for their racial-religious-color bloc? At the fourth level of consideration, what advantage to the small nation bloc over the large; or how would it enhance the special privileges of the large over the small? Down at the fifth level, could it preserve the status

quo, changing nothing so that those in power could remain in power, while, at the same time, giving the illusion of progress to confound the ever clamoring liberals? At the deep sixth level, if one ever got down that far, one might give a small fleeting thought to what might be good for mankind.

If Dr. VanDam even knew that such political realities must ever take precedence over the dreams of science, he gave no sign of it. It was as if all his thought was upon the glory of the stars and the dream of man reaching out to them. It was with the goal of reaching the stars in mind that he spoke.

"We must sum up the problem," he was saying. "It is simply this. There is a limit to how far we can theorize in science without testing those theories to see if they will work. Sooner or later the theorist must submit himself into the hands of the engineer whose acid test of worth is simply this: 'Does it work?'"

"We have always known that the Roman candles we are using for our timid little space flights can take us only to the nearest planets; for there is that inexorable ratio of time to initial thrust; that unless thrust continues and continues the Mayfly lifetime of man will expire many times over before we could reach the nearest star. Nor will our

limited resources fuel ion engines, and we must learn how to replenish with space dust gathered along the way.

"To have continuous velocity we must have continuous nuclear power. To have continuous nuclear power, we must have more nuclear tests. Now we believe we know how to take not special ores but ordinary matter, of any kind, and convert it into nuclear power. We believe we can control this. We have this in theory. But the engineer has not tested it with his question, 'Does it work?'"

"We cannot make these tests on Earth. For what if it does not work? We dare not use the Moon. Its lighter gravity makes it too valuable a piece of real estate in terms of future star journeys. It will be our busy landing stage; we dare not contaminate it nor risk destroying it.

"We have reached stalemate. On Earth and Moon we can go on no farther without testing. On Earth and Moon we dare not test. Some other testing area must be found.

OUR explorers have brought us conclusive proof that Mars is a dead world. A useless world in terms of life. Useless, too, as a source of minerals, for our little Roman candles can carry no commercial payload. A useless world for colonization, with air

too tenuous for human lungs and water too scarce for growing food. Humans must be housed in sealed chambers, or constantly wear spacesuits. From all practical points of view, a worthless world.

"But invaluable to science. For there, without destroying anything of value to man, we can put our theories to test. We believe we can start a nuclear reaction in ordinary rock and dirt, and keep it under control to produce a continuous flow of power. We believe we can keep it from running wild out of control.

"If the innumerable tests we must run do contaminate the planet, or even destroy it slowly, our gain in knowledge will be greater than the loss of this worthless real estate."

There was a stir in the Assembly; something between a gasp of horror and admiration at the audacity of man's sacrificing a whole planet to his knowledge. They had not known we were so far along the way.

And then, on second thought, a settling back in satisfaction. It seemed a simple solution to an impossible problem. To take not only VanDam's tests away from Earth, but all nuclear testing of every kind! To quell the fears and still the clamoring of the humanists who would rather see man stagnate in ignorance than risk the future to learn. At every

level of political reality this might turn to advantage. If there were any who still thought in such terms, it might even be good for mankind generally!

"I am not mystic minded," VanDam continued when the rustle and murmur had diminished. "But the convenience of this particular planet, located precisely where it is, far enough away that we must have made great progress in science to reach it, and close enough to be ready when we need it for further progress; this seems almost mystical in its coincidence."

(That for the ones who would have to go through the usual motions of obtaining Higher Power approval for doing what they fully intended doing all along.)

"My question: Shall the nations of Earth agree upon our use of this so convenient, and otherwise worthless, ready-at-hand stage placed right where we need it—waiting for us down through all the ages until we should be ready to make use of it?"

THEIR ultimate response was favorable.

Dr. VanDam did not mention, and being only politicians unable to see beyond the next vote or appointment they did not ask;

True, we do have a theory of how to start and continue the slow burn nuclear conversion of

ordinary rock and dirt to energy. What we do not have, as yet, is a way to stop it.

We *think* that eventually future man will probably find a way to stop the process. We *think* slow burn will not speed up and run out of control to consume an entire planet before we have found a way to stop it. We *think* that future science may even find a way to decontaminate the planet. We *hope* these things.

But we *know* that the science of nucleonics will be stillborn and stunted to grow no farther unless we go on testing. We convince ourselves that even if an entire planet is consumed, it is a worthless planet anyway, and will be worth it.

Yet there was the usual small minority who questioned our right to destroy one of the planets of the solar system. There is always such a minority, and as always, the rest of the world, intent on turning what it intended to do anyway into the Right-Thing-To-Do, was able to shout them down.

Anyway, the consequences were for future man to face. Or so we thought.

I say we, because I was one of the members of Project Slow Burn. Not that I'm the hero. There wasn't any hero. Mistaken or not, it was conceived this wasn't one of those television spectaculars cooked up to convert sci-

ence into public emotionalism. There was no country-wide search for special photogenic hero-types to front the project.

The reporters, true to their writing tradition of trying to reduce even the most profound scientific achievement to the lowest common denominator of sloppy sentimentalism or avid sensationalism, tried to heroize Dr. VanDam as head of the science side of the project. But he wasn't having any.

"Don't you think, gentlemen," he answered them with acid scorn, "It is about time the public grew up enough to support the search for knowledge because we need it, rather than because they'd like to go to bed with some handsome, brainless kook you've built up into a hero?"

This response was not likely to further the cause of journalism.

They tried to lionize Captain Leyton, as head of the transport side of it; but his remarks were even more unprintable.

They never got down far enough through the echelons of status to reach me. I was Chief of Communications, which is just another way of saying I was a television repair man with headaches. Not that it would have done them any good.

There isn't one thing about me that fits the sentimental notions of what a hero should be. I'm not

even a colorful character. If I'm expert in my job it's only because I learned early what any lazy man with an ounce of brains also learns—that life goes easier for the expert than for the ignorant. Which is not exactly the hero attitude the public likes to hear, but true all the same.

I did have an advantage which qualifies me to tell this tale.

SUPERVISION, nowadays, sits on its duff in an office surrounded by television monitors showing them every phase of their responsibilities, and punches buttons when some guy tries to goof-off or starts lousing up the operation.

Somebody has to maintain the system and check the same monitors. I saw everything of importance that happened.

That's the only way I come into the yarn at all. I didn't start out a hero type. I didn't turn into one. I just watched what happened; and I got sick at my stomach along with everybody else. And now I slink away, sick and ashamed, and not understanding even that, along with the rest. Not heroes—no—none of us.

From the first this was intended and conducted as a genuine scientific project, a group effort, with each man's ego subdued and blended in to serve the needs of the whole. No special heroes emerging to show up the rest of

the dopes. None of the usual stuff of romantic fiction was supposed to happen—those unusual dangers, horrible accidents, sudden frightful emergencies so dear to the little sadistic hearts of readers and viewers.

So far as I know, nobody beat up anybody with their fists, nor gunned them down; which is the usual, almost the only, fictional way yet found among the humanists for coping with life problems.

We assembled the mastership on the Moon base from parts which were Roman candled up, a few pieces at a time, from too heavily gravitied Earth.

The yelps of pain from taxpayers reached almost as high. It was one thing to wash the hands of the vexing problem of nuclear testing by wanting it shifted out to Mars. It was something else to pay for having it.

Against the Moon's lighter gravity we eventually were space-borne with no more than the usual fight between power thrust and inertia, both physical and psychological.

Without touching that precious reserve of fuel which we hoped would bring us back again, we were able to build up enough speed that it took us only a month to reach Mars. No point in showing, because nobody would care, how the two dozen of us were cramped in the tiny

spaces left by the equipment and instruments we had to carry.

Construction and maintenance had done their job properly, and, for once, inspection had actually done its job, too. We were able to reverse properly at the right time, and soft cushion powered our way down into a Martian plain eastward of a low range of hills.

Surely everybody has watched the documentaries long enough to have some idea about the incredibly hostile surface of Mars; the too thin air, which lets some stars shine through even in daytime; the waterless desert; the extremes of temperature; the desolation. . . .

Ah, the desolation! The terrifying desolation!

MOON surface is bad enough; but at least there is the great ball of Earth, seeming so near in that airless world that one has the illusion of being able to reach out and almost touch it, touch home, know home is still there, imagine he can almost see it.

"See that little tip of land there on the east coast of the North American continent? That's where I live!"

"Yeah," somebody answers. "And who is that guy walking through your front door without knocking while you're away?"

Sometimes it seems that close.

On Mars, Earth is just another bright spot in the black night sky; so far away that the first reaction is one of terrible despair, the overpowering conviction that in all that vast hostility a man will nevermore see home; nor know again the balmy twilight of soft, moist summer; nor feel the arms of love.

Explorers had not lied. Nothing, anywhere, could be more worthless to man than the planet Mars. Worthless, except for the unique purpose which had brought us there.

We dug in beneath the surface.

Now surely, again, everyone has seen enough of the documentaries that it is unnecessary to show us digging out our living quarters and laboratories beneath that merciless plain. We used the displaced powdered rock to form a crude cement, not long lasting but adequate for the time we would be there. With it, we surfaced over our living area. This was not so much to provide a landing field, since most of our journeying would be in individual jet powered spacesuits; but to help insure against any leakage of air if our inner seals cracked.

To help seal out the killing radiation we intended to let loose—that, too.

We erected Come-to-me towers at each elevator which would lower space-suited men to lower lev-

els where they could go through locks to reach their quarters. One Come-to-me tower for each half dozen men, tuned to the power source of their suits, to bring each man safely back, as truly as a homing pigeon, to guarantee against becoming lost on that hostile planet; and, in emergency, should one arise, to see that no panic mob ganged up at one lock and died waiting there for entrance to safety while other locks remained idle—the human way of doing things under stress.

WE had to finish all that in the first few weeks before any nuclear tests could be started. Anybody whose notions of science are derived from white-froked actors in television commercials hasn't the vaguest idea of how much back breaking physical work at the common labor level a genuine scientist has to do.

There was some emotional relief once we had dug in and sealed out the awful desolation of an uncaring universe. (This is the hardest part of reconciling oneself to the science attitude. More comforting to believe even that the universe is hostile than to admit that it simply doesn't care about man, one way or another.) In our sealed quarters we might briefly imagine ourselves working in an air conditioned laboratory back home.

It helped. It certainly helped.

Not that I seemed to find time for more than exhausted sleeping there. To see what would be going on at the various field sites where tests were to be run meant the cameras had to be installed at those spots. In spite of the purported rigid tests for expedition personnel, my two assistants must have been somebody's nephews. Somehow each installation seemed to require I be there.

Be there, and usually without some little piece of equipment which would have helped so much, but which had been deleted from the lists we submitted by clerks who were more concerned with making a big showing on how much weight they could eliminate than in helping us.

Somehow we managed.

But I have made a little list of guys I'm going to ferret out and poke in the nose once I get back to Earth. Maybe those Hollywood producers who think the only way to solve a problem is to beat up somebody or gun him down have something, after all. Right on top of that list, in big bold letters, is the spacesuit designer who thinks a man can handle the incredibly fine parts of miniaturized electronic equipment with those crude instruments they give us to screw into the arm ends of spacesuits.

Somehow we managed. Some-

how, out of chaos, order came. Somehow tests got made. Sometimes the theories worked; sometimes, more often, there was only the human sigh, the gulp, the shrug, and back to the drawing board.

Big surprise at the end of the first three months. A supply ship landed. Mostly food and some champagne, yet! Stuff the folks back home thought they'd like to have if they were out there. Even some pin-up pictures, as if we weren't already having enough trouble without being reminded. But none of the equipment we'd radioed for in case the taxpayers could forego a drink and a cigarette apiece to raise money for sending it. The public couldn't understand our need for equipment, so they didn't send any. Miracles aren't supposed to need any equipment or effort; they just come into being because people want them.

The packages of home baked cookies were welcome enough after our diet of hydroponic algae, but I'd still rather have had a handful of miniature transistors.

Some of the guys said they'd have been willing to substitute their cookies for an equal weight of big, buxom blonde; but that's something the cookie bakers probably preferred not to think about.

The little three man crew of

the supply ship, as they were taking off for their return journey, promised they'd tell 'em what we really wanted when they got back, but I doubt the message ever got broadcast over the home and family television sets. Anyway, scientists are supposed to be cold, unfeeling, inhuman creatures who wander around looking noble, wise, and above it all.

In the beginning I'd thought that once I got the heavy work of installation completed, I could do a little wandering around looking wise and noble, myself. No such luck. I'd no more than get set up to show one experiment than it was over; and I'd have to dismantle, move, and set up for another. We'd thought the lighter gravity of Mars, thirty-eight percent, would make the labor easy. But somehow there was still lifting, tugging, pulling, hauling, cursing.

But then, nobody wants to hear how the scientist has to work to get his miracle. The whole essence is the illusion that miracles can be had without work, that all one needs is to wish.

All right. So we'll get to the miracle.

NOW we were finally ready to get down to the real test, the main reason for our coming out to Mars—Project Slow-Burn.

VanDam chose a little pocket at the center of that little cluster of hills to our West—that little cluster of hills everybody has seen in the pictures radioed back to Earth.

We didn't know it at the time, but that little cluster of hills was causing quite an uproar among archeologists back home. No archeologist had been included in the expedition, and now they were beating their breasts that from the pictures those hills looked mighty artificial to them. There was too much of a hint that the hills might once have been pyramids, they said; incredibly ancient, perhaps weathered down eons ago when the planet was younger, before it had lost so much of its atmosphere, but maybe still containing something beneath them.

We didn't hear the uproar, of course. Administration deemed it unnecessary for us to bother our pretty little heads about such nonsense. In fact the uproar never got outside the academic cloister to reach the public at all. Administration should have listened. But then, when does man listen to what might interfere with his plans to spoil something?

We got all set to go in that little pocket at the center of the hills. The spot was ideal for us because the hill elevations gave us opportunity to place our cam-

eras on their top to focus down into the crater we hoped would appear.

A whole ring of cameras was demanded; as if the physicists shared too much of the public's attitude, and all I needed to produce enough equipment was to wish for it. But by stripping the stuff from virtually every other project, I managed to balance the demands of the Slow-Burn crew against the outraged screams of the side issue scientists.

VanDam's theories worked.

At first it took the instruments to detect that here was any activity; but gradually, even crude human eyes could see there was a hole beginning to appear, deepen and spread—progressively.

It was out of my line, but the general idea seemed to be that only one molecular layer at a time was affected, and that it, in turn, activated the next beneath and to the side while its own electrons and protons gave up their final energy.

The experiment did not work perfectly. The process should have been complete. There should have been no by-product of smoke and fire, no sign to human eyes of anything happening except a slowly deepening and spreading hole in the ground.

Instead there was some waste of improperly consumed molecules, resulting in an increasing-

ly heavy, fire-laced smoke which arose sluggishly in the thin air, borne aloft only by its heat, funneling briefly while it gave up that heat; then to settle down and contaminate everything it touched.

To compound my troubles, of course.

THE physicists were griping their guts out because I didn't have the proper infra-red equipment to penetrate the smoke; and somehow I wasn't smart enough to snap my fingers and — abracadabra — produce. Those damned cookie packages instead of equipment! Those damned clerks who had decided what we wouldn't need. My little list was getting longer.

Still, I guess I was able to get a feeble little snap from my fingers. I did manage to convert some stuff, never intended for that purpose, into infra-red penetration. We managed to see down into that smoke- and fire-filled crater.

To see enough.

It was the middle of a morning (somebody who still cared claimed it would be a Tuesday back home) some three basic weeks after beginning the experiment. The hole was now some thirty feet across and equally deep, growing faster than Vandam's figures predicted it should, but still not running wild

and out of control. Even if it had been, we couldn't have stopped it. We didn't know how.

I was trying to work out a little cleaner fix on the South wall of the crater when that wall disappeared like the side of a soap bubble. My focus was sharp enough to see.

To see down and into that huge, vaulted room. To see the living Martians in that room shrivel, blacken, writhe and die. To see some priceless, alien works of art writhe and blacken and curl; some burst into flame; some shatter unto dust.

That was when the scientists, sitting there watching their monitors with horror-stricken eyes, felt jubilation replaced with terrible guilt.

I, too. For naturally I was watching the master monitors to see that the equipment kept working. I saw it all.

I saw those miniature people, yes people, whole and beautiful, in one brief instant blacken, writhe and die.

Out of the billions of gross people on Earth, once in a generation a tiny midget is born and matures to adult of such perfection in proportion and surpassing beauty that the huge, coarse, normal person can only stare and marvel—and remember the delicate perfection of that miniature being, with nostalgic yearning for the rest of his life.

From such, perhaps, comes the legends common to all peoples in all ages, of the fairies. Or, eons ago, was there traffic between Earth and Mars? Or even original colonization from Mars to Earth, finally mutating into giants? They were people, miniatures of ourselves.

I saw them there. Perhaps not more than a dozen in that room. But in other rooms? Perhaps in a lacework of underground rooms? A whole civilization which, like ourselves on Mars, had gone underground, sealed themselves in against the thinning atmosphere, the dying planet?

And we had begun the atomic destruction of their planet. We had begun it. We could not stop it. The corrosion keeps growing, spreading.

I saw them die. Somehow I felt their pain.

But I did not die of it.

I carry it with me. I shall always carry it with me.

THAT's all there is.

In years to come people on Earth, people who did not see what we saw, did not feel the pain and guilt we felt, will wonder at our behavior following that.

Oh there is much to wonder. If there is a civilization, where does their food come from? If they are able to convert rock to

food, why are they not able to stop the atomic destruction of their planet we have started? If they are able to so fill us with their own grief for what we have done that we can think of nothing but to slink away, like whipped curs caught in vandalism; why didn't they do this before we started the fire we cannot stop?

Oh, there is so much unanswered. People will wonder that we simply abandoned most of our equipment, the very project itself; that for a sick hour we watched, then, with one accord, without anybody making the decision, we began to withdraw and start for home.

Like small boys, thinking only to vandalize a schoolhouse in their savage glee, discovering it is a shrine.

Or, perhaps in time, we can rationalize it all away. Perhaps so soon as during that long, journey back.

It wasn't our fault, we shall begin to say. They were as much to blame as we. Sure they were!

More to blame! They were more to blame than we!

Why didn't they come out of their holes and fight us? With their fists if they didn't have any guns? *Any* red-bloodied—er, red-blooded—Amuri—well, whatever they are—ought to have enough guts to come out and fight, to

sequel *The Naked Sun*, are incontestably science fiction. Yet they also adhere to every definition of the detective story, even if the "Dr. Watson" is a robot and "Inspector Lestrade" turns out to be the murderer. The two stories are *the* outstanding masterpieces in the delicate art of honestly solving a plausible crime within the framework of science fiction without succumbing to the temptation of permitting the killer to enter the locked room through the fourth dimension.

Yet the techniques of this achievement represent but one of *three* major contributions Isaac Asimov has made to the development of science fiction in the past two decades. They rank him among the prime movers in the field.

THAT Isaac Asimov was ever permitted to make his contribution to science fiction at all was entirely due to an accident of heredity. He was born in the town of Petrovich, a suburb of the Russian city of Smolensk, in 1920. The name Asimov, in Russian, means "winter wheat grower," and, under the Czar his grandfather did own a mill at which Asimov's father worked as an accountant. Asimov's family was of the Jewish faith. Upon the establishment of a communist regime after World War I,

anti-semitism was reinforced. The great Russian famine of 1923 made that government more lenient towards emigration. The Asimovs, with Isaac as a toddler and sister Marcia a babe in arms, seized the opportunity to come to the United States.

Unable to get a job as an accountant because of the language barrier, Asimov's father bought the first of what was to be a series of candy stores in Brooklyn, and Isaac went to public school. In 1929 a brother, Stanley, was born, offering Isaac the prospect of eventual relief from the after-school chores at his father's store. Secondly, it was the year he read his first science fiction magazine.

Though Asimov's father maintained strict censorship over his son's reading matter, they were both fascinated by the drawing of a ball of fire suspended over some test tubes on the August, 1929, cover of *AMAZING STORIES*. To the elder Asimov, it looked educational enough to pass muster. The story illustrated was *Barton's Island*, by Harl Vincent, a tale of a young inventor exiled from a tyrannical United States who returns to free his nation from bondage. Young Asimov was enthralled. He decided to supplement his education with *AMAZING STORIES* from then on.

An astonishing recall of facts, verging on the legendary "photo-

graphic" memory, aided Isaac in completing grammar school at the age of 11½. At the age of 15½ he was out of high school. This facility for learning immensely pleased his parents, but Isaac had other characteristics that didn't please them as much. He was, for example, always preoccupied, brushing past people he knew with no sign of recognition. This upset his mother since among the people Isaac so blithely ignored were customers of her husband's candy store. Isaac didn't care what anyone thought. He was, during those early years, extremely introverted. Unlike most young boys, Isaac had an aversion to any physical activity, sports second only to labor.

HIS FIRST ambition was to become a physician. But he was unable to gain admission to any medical school. (This later proved a good thing, because Isaac had a tendency to grow faint at the sight of blood.) Instead he decided to study chemistry at Columbia University. While at college Isaac took a flyer at writing science fiction; and during that same period he made the friendship of aspiring science fiction writers and editors. Asimov helped to found The Futurian Science Literary Society of New York on Sept. 18, 1938—a group pledged to mutually aid one another in climbing the lad-

der to literary success. Other charter members of the organization included Frederik Pohl, Donald A. Wollheim, Cyril Kornbluth, Walter Kubielski and Robert W. Lowndes, all of whom were destined to become well-known figures in the professional science fiction world.

Six weeks later, Oct. 30, 1938, Orson Welles scared the United States out of a night's sleep with his adaptation of H. G. Wells' *War of the Worlds* on radio. The Futurian Society seized the opportunity to hold a debate on whether Earth should voluntarily give up to a superior civilization or whether it should fight. Wollheim debated for the Martians and Asimov advocated terrestrial supremacy. This, was the science fiction world's first exposure to the devastating Asimov barrage of extemporaneous shot-gun humor delivered with the expression of a stricken martyr in the cryful lament that was to become his trademark at meetings for the next 20 years.

A few weeks earlier Asimov had made his first sale to *AMAZING STORIES*, *Marooned Off Vesta* (March, 1939). The plot was derived directly from Asimov's chemistry studies. Survivors of a disabled space ship find themselves with three days' supply of air and one year's supply of water. They save themselves by utilizing the principle that the

boiling point of water is so low in a vacuum that the slightest heat will turn it into steam, which can be used for jet propulsion. This same principle is today commercially used in processing freeze-dried foods.

Marooned Off Vesta was the third story Asimov wrote. All had been submitted to John W. Campbell, Jr., editor of *ASTOUNDING SCIENCE-FICTION*. He had rejected the first two. Yet, when announcement of the publication of *Marooned Off Vesta* was made in the Jan. 4, 1939, issue of *FUTURIAN NEWS*, it also carried the statement: "John W. Campbell remarked of Asimov that he expects him to go far as a writer. His work, as far as that editor has seen, being very, very good."

CAMPBELL was as good as his word. He bought another story from Asimov—*Ad Astra*—which appeared in *ASTOUNDING*, July, 1939, as *Trends*. While not quite hitting the target as a story, the theme was quite advanced for so young a writer: it suggested that an anti-scientific attitude resulting from popular reaction to war might hold back space travel even when all the technical elements for its success were present. (A few months earlier Asimov's story *The Weapon Too Dreadful to Use* had appeared in *AMAZING STORIES* (May, 1939). It was based on the pre-

mise that earthmen will tend to enslave inferior races they meet in their exploration of other planets. Extremely weak as a story, it nevertheless pointed up Asimov's interest in political and sociological aspects of interplanetary exploration, a phase of the field he would eventually settle on. *ASTOUNDING* was the leading science fiction magazine in 1939. The issue that carried *Trends* also featured the first story of A. E. van Vogt (*Black Destroyer*) as well as a poignant novelette, *Greater Than Gods*, by C. L. Moore. Asimov had to be satisfied with third place in that magazine's *Analytical Laboratory*. But he did have the ego-inflating satisfaction of beating out Nat Schachner, who, along with Edward E. Smith, was one of the two science fiction writers he most admired at that time.

But suddenly many of Asimov's stories began misfiring. In 1938 Isaac had written to Clifford Simak, whose stories were beginning to appear again after a hiatus of some years, criticizing Simak's deliberate commission of transitions between scenes in that author's stories. Now Asimov began to wonder if Simak wasn't right in leaving out the dull parts to get to the point of the action. He decided to adopt that method. Fred Pohl, who had been acting as Asimov's literary agent, went to work with

Popular Publications to edit two new science fiction magazines—ASTONISHING STORIES and SUPER SCIENCE STORIES. ASTONISHING STORIES had the distinction of being the first 10¢ science fiction magazine in history. It carried a novelette by Asimov titled *Half-Breed*. Asimov was horrified by the excess of racial intolerance as practiced by the Third Reich. His "Tweenies," children of Terran-Martian ancestry, identifiable by hair that grew straight up, are subjected to a mixture of the abuses which Jews and Negroes have been heir to. The story of their fight for equality and eventual migration to Venus was the most popular story in the magazine.

ASTONISHING STORIES carried in its April, 1940, issue, *Callistan Menace*, a tale of worms able to kill at a distance by creating a deadly magnetic field. Chronologically, this was actually the second story written by Asimov. The first, and six others between late 1938 and 1940, were never sold, and have been destroyed. After 1940 Asimov sold every story he wrote. (While all this was going on Asimov, with the aid of his trick memory, had obtained his B. A. in June, 1939, at the age of 19½; two years later he had his M. A. The emphasis on physical science displayed in his earliest stories was to shift towards the sociological, but his

technical education gave his stories an added touch of authenticity.)

NORMALLY, a story as clever and entertaining as Isaac's next in ASTOUNDING—*Homo Sol*—would have attracted considerable attention. Any hope of that was thwarted by the inclusion in that same Sept., 1940, issue of *Slan*, by van Vogt, and *Blowups Happen*, by Robert Heinlein. As it was, Asimov's satire of the positive and negative aspects of the human race, as evaluated by members of a Galactic Federation considering whether to open commerce with the Earth, rated just below those two landmarks.

The first robot story attempted by Isaac Asimov was *Strange Playfellow*, rejected by Campbell in June, 1939. Pohl published it in the Sept., 1940, SUPER SCIENCE STORIES. A pleasant tale of the affection of a little girl for her play robot, it caused no stir at the time of publication. But it did introduce the name "Robbie" for robot, which has since become as common a designation for a mechanical man as "Rover" used to be for dogs.

Underservedly forgotten was a short story titled *The Secret Sense*, a well-thought out and nicely written account of an Earthman whose cortex is stimulated by Martians to enable him to experience a sensory action

common only to them. When he loses this ability after only 10 minutes, he is overcome by anguish that he can never again know the beauty of that "secret sense."

This story was written gratuitously by Asimov for fellow Futurian Donald A. Wollheim, who had become editor of the low-budget COSMIC STORIES and STIRRING SCIENCE STORIES. When it appeared in the March, 1941, COSMIC STORIES and word got to Campbell that Asimov was donating stories to competitors, Campbell read Asimov the riot act, and insisted that Isaac demand payment for the story if he wanted to remain a contributor to ASTOUNDING SCIENCE-FICTION. Asimov tearfully induced the powers at COSMIC STORIES to pay him. It was indeed fortunate that he did, for he had submitted to Campbell a story about an intelligent robot assembled on a space station who refused to believe that there was an Earth, or that robots were built by man. This story was to make history. Titled *Reason*, and published in ASTOUNDING, April, 1941, it laid the foundation for the now-famous three laws of robotics.

The first time Asimov heard of those laws was when he walked into Campbell's office after the story was accepted and had them recited to him:

1. A robot may not injure a

human being, or through inaction allow a human being to come to harm.

2. A robot must obey the orders given it by human beings except where such orders would conflict with The First Law.

3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

Asimov claims Campbell invented the laws. Campbell asserts they were implicit in the story, as indeed they were.

The results were truly revolutionary. Not only did Asimov go on to write a tremendously successful series of robot stories (a selection of which were collected in *I, Robot*, Gnome Press, 1950) most of which were based on seeming breaches of the three laws; but these rules have come to be accepted by an ever-growing body of contemporary science fiction writers. That robots, when they are eventually built, will be subject to the "Three Laws of Robotics" has become axiomatic in a large area of science fiction.

ORDINARILY that should have clinched Asimov's reputation. Unfortunately, Campbell once again, included in the same issue as *Reason* a masterpiece by Theodore Sturgeon (*Microcosmic Gods*) and a novel by L. Sprague de Camp at his satiric best (*The Stolen Dormouse*).

Asimov's ability was not lost on Campbell, however. At his next visit to Street & Smith's offices, Campbell read him the famous quotation from Ralph Waldo Emerson: "*If the stars should appear one night in a thousand years, how would men believe and adore, and preserve for many generations the remembrance of the city of God!*"

"What do you think would really happen if men saw stars only once in a thousand years," Campbell asked.

Asimov shrugged.

"They would go mad!" Campbell shouted. "Now go home and write the story."

The realistic delineation of a world of six suns, where an eclipse causes darkness but once every two thousand years, and the psychological doom that overtakes its inhabitants at that time, possessed such an impact that Campbell gave him a financial bonus as well as the cover of the Sept., 1941, *ASTOUNDING*. An acknowledged masterpiece, *Nightfall* was acclaimed at the time of printing, but—again!—the near-tragedy of including it in the same issue as the conclusion of Robert Heinlein's famed novel *Methuselah's Children* deprived it of a first-place rating. Nevertheless, it proved that Asimov had the stuff that makes front-line science fiction writers.

During the time Asimov was

making his mark as a writer he was not oblivious to the positive points of the opposite sex. Among the girls he escorted was Mary G. Byers, one of the few feminine science fiction fans of that era, who was in New York on a visit from a Midwestern farm. Eventually Isaac introduced her to Cyril Kornbluth, whom she later married. The girl who really took as far as Asimov was concerned was Gertrude Blugerman, a Toronto girl whom Asimov met in Brooklyn on St. Valentine's Day in 1942 and married on July 26 that same year. Perhaps one secret of their marital success is, as Isaac put it: "As far as writing is concerned I am my own boss. She neither reads what I write nor offers advice nor in any way, directly or indirectly, guides my professional life. Around the house, it's another matter." (The Asimov's had two children, David in 1951 and Robyn in 1955.)

ONLY weeks before the wedding, Heinlein was instrumental in helping Asimov obtain his first important job at the Naval Aircraft Factory in Philadelphia, where Heinlein himself was working along with L. Sprague de Camp. Asimov spent 1942 to 1945 as a chemist in the experimental laboratories. But neither marriage nor a new job affected Asimov's devotion to

writing. He came to Campbell with the plot suggestion for a story based on the rise of a second galactic empire after the fall of the first. Asimov had just read Edward Gibbon's *Decline and Fall of the Roman Empire* and was mightily impressed. He had initially intended one story, but Campbell suggested a series. The Foundation stories, as they have since become known, were based on the "science" of psycho-history, a means of accurately projecting trends in a highly specific manner thousands of years into the future. The method was perfected by a man named Hari Sheldon, who establishes two "Foundations" to speed the rebuilding of galactic civilization after its forecast collapse. The series—novelettes and novels—ran in ASTOUNDING SCIENCE-FICTION sporadically from 1942 through 1949. They were eventually gathered into three volumes by Gnome Press: *Foundation* (1951); *Foundation and Empire* (1952); and *Second Foundation* (1953).

The series fundamentally possesses the same appeal as Heinlein's "Future History." It adheres to a galactic frame of reference to which most of Asimov's major works, even those not connected with the series, also conform. The action is primarily cerebral. Everything that happens is the result of the machina-

tions of a prime mover, shifting power elements like players on a chess board. In Asimov's own words: "It seems to me that the Conans are less apt to have permanent importance than the Richelieus. Even when a great conniver uses wars as a means to an end, they are only incidental and usually short."

THE most important thing the Foundation series contributed to science fiction was a concept. There had been galactic empires in science fiction before. Olaf Stapledon outlined them magnificently in *The Star Maker*, and they were implicit in the background of Edward E. Smith's *Galactic Patrol*. But this was the first time that any author had the effrontry to insist that *all* the myriad worlds of the vast galactic cluster would be colonized and dominated by a single species: man! Three years later van Vogt's novel *The World of A* laid the biggest egg in years when it built up to a smash climax that never registered. That climax was to be the readers' realization that *all* the inhabited worlds of the galaxy were occupied by human beings! Such a premise had been as implicit in Asimov's *Foundation* stories as the three laws of robotics had been in his robot stories—but no one had ever bothered to point it out.

The psychological basis for this concept does not rest in imaginative inertia, but may be found in Asimov's primer for his own "Future History," *The End of Eternity*. Rejected by the major magazines and finally published as a book by Doubleday in 1955, it is the novel that Asimov most enjoyed writing. Clearly inspired by John Russel Fearn's action epic, *The Liners of Time*, and carrying echoes of van Vogt's *The Search*, it postulates a time traveling "foundation" whose members change the past to enable humans to conquer all the stars of our galaxy before alien intelligences can stop them. As the book nears its conclusion, Asimov, through one of his lead characters, states: "*Without the interplay of human against human, the chief interest in life is gone; most of the intellectual values are gone; most of the reason for living is gone.*"

That is why aliens appear so infrequently in Asimov stories.

Drafted after World War II, Corporal Asimov was assigned to the Quartermaster Corps and ordered to a Pacific atoll where an atomic test was to be held. He got as far as Hawaii, where he was discharged after six months. Asimov then returned to Columbia where he received his doctorate in 1949, when he became an instructor in bio-chemistry at Boston University.

THE Asimov stories that appeared during the period of his studies at Columbia were few but outstanding. Yet, though growing swiftly in skill and maturity, Asimov still encountered sales problems. At the solicitation of Sam Merwin, Jr., who was in the process of improving STARTLING STORIES and THRILLING WONDER STORIES, Asimov wrote a short novel, *Grow Old Along With Me*. Merwin rejected it. So did Campbell. Two science fiction fans—Paul Dennis O'Connor and Martin Greenberg—scheduled it for a limited edition under the aegis of New Collector's Group, when word came through that Doubleday was looking for science fiction. Asimov sent it to Doubleday editor Walter Bradbury, who suggested the story be lengthened to novel size. The result was *Pebble in the Sky*. Inspired by lines from Robert Browning which Asimov had memorized in his youth:

"Grow old along with me!

The best is yet to be,

The last of life, for which the
first was made . . ."

Pebble in the Sky preached that the old-age of the planet earth could be anything but beautiful. In the Galactic Era 827 Earth is a radioactive plane inhabited by men who are pariahs to the rest of the galaxy. No one any longer remembers that Earth was the mother planet. Joseph

Schwartz, the older-than-middle-aged co-hero, is catapulted into the future from the 20th Century by an atomic mishap (he possesses a "trick" memory similar to Asimov's own). A device which temporarily stimulates the intelligence of mice, who usually die from the after-effects, is tried on Schwartz, for he has been helpless as a moron in his strange situation. But with his new advanced intelligence he is able to save himself and the entire galaxy.

MORE than any single factor, this novel was responsible for elevating Asimov into the top rank of science fiction writers. Reviews of the book were excellent. It was reprinted in TWO COMPLETE SCIENCE ADVENTURE NOVELS, in GALAXY NOVELS, in paper back reprint, and abroad. Significantly, it was selected as a Unicorn Mystery Book Club selection by Hans Stefan Santeson, who recognized the classic mystery story technique in its plot structure.

Heartened by this success, Asimov decided to stress the novel. *Tyrann*, his first work deliberately written as a novel, was serialized in GALAXY SCIENCE-FICTION beginning in Jan., 1951. Issued in hard covers by Doubleday as *The Stars Like Dust*, it relates a chase through the galaxy in search of a secret document

which may be the key to the overthrow of tyranny. Virtually the *only* redeeming feature of the novel is its denouement. In its early days science fiction was enabled as a medium of utopian proclamation, most often constructively democratic and hopeful in tone. When dictatorship was projected, it was inevitably done as a "warning" factor. Since 1939, however, governments of the future based on democratic principles have been all-but-non-existent in science fiction. Perhaps the pessimism created by World War II and the onset of atomic energy are responsible, but it is singularly notable when the "secret document", the object of the galactic search in *The Stars Like Dust*, turns out to be a copy of the Constitution of the United States. When Asimov concludes: "*The time for maturity has come as it once came on the planet Earth, and there will be a new kind of government, a kind that has never yet been tried in the Galaxy,*" he is being virtually the only science fiction author in modern times to suggest democracy as a form of galactic government!

His next novel, *The Currents of Space* (ASTOUNDING SCIENCE-FICTION, Oct.-Dec., 1952), was a far better work. Especially effective was the characterization of Big Lona, the peasant girl of the

planet Florina who befriends Rik, a member of the galactographic corps. Scientific originality is shown in the function of this corps, which measures the nature and movement of particles in space.

Asimov now felt up to attempting a full-length novel based on robots. H. L. Gold suggested the incorporation of a robot detective and the Malthusian outlook on over-population. Serialized in GALAXY SCIENCE-FICTION, beginning in October, 1953, *Caves of Steel* put Asimov in a class by himself. No one had previously succeeded so brilliantly in wedding the detective to science fiction; and his carefully thought out over-populated metropolis of the future was sketched more with love than with loathing.

SCIENCE fiction readers finally offered Isaac Asimov their greatest personal tribute: they made him Guest of Honor at the 13th World Science Fiction Convention in Cleveland in September, 1955. The same year he was made Associate Professor at Boston University, pursuing research in nucleic acid. The pressures of writing made it increasingly difficult for him to do justice to either career. There was University pressure on Asimov to do more research and less writing. But Asimov, who had already written several non-fiction

science books, felt he could be of more benefit to the university by writing.

When Asimov had won his professional rank, the rules of the university permitted a faculty member with a requisite number of years of service to retain his title for life, even if he resigned. Those rules had been changed in the interim so that the title could be lost on resignation. Asimov took the matter to a vote of the full faculty. He won. In 1958 he "retired" to full-time writing, retaining his associate professorship by giving several lectures each year.

Asimov now poured his energies into scientific articles and books. The facility to express himself clearly and engagingly, which made him one of the finest lecturers in the history of Boston University, coupled with his extraordinarily retentive memory, added up to instant success as a purveyor of popular science. As many as six books a year flowed from his reference-lined attic workshop: *The Chemicals of Life*, *The Wellsprings of Life*, *The World of Nitrogen*, *The World of Carbon*, *Inside the Atom*, *Building Blocks of the Universe*, *The Clock We Live On*, *The Realm of Numbers*, and many others were climaxed by the critically acclaimed *The Intelligent Man's Guide to Science*, a two-volume boxed set, ambi-

tiously aimed at familiarizing the layman with the complete range of physical and biological sciences.

THE impact on the public of Isaac Asimov's two-pronged writing career is pridefully and painfully apparent to brother Stanley Asimov, now night city editor of *NEWSDAY*, a leading Long Island newspaper. "It's gotten so I avoid telling anyone my name," he moans. "Co-workers, chance acquaintances, people I meet in the course of business all follow the same pattern. 'Asimov? Asimov? Any relative to the Isaac Asimov?'"

"Why, when I was first introduced to my wife Ruth, the first words out of her mouth were: 'Asimov? Asimov? Any relative to the Isaac Asimov?'"

If Isaac Asimov has changed in any way in the past 20 years

it is in the gradual diminution of his zany exhibitionism and spontaneous explosions of humor. Only the robot stories reflect this aspect of his nature, and then in a satiric vein. At heart, Isaac Asimov is and always has been a serious man. Perhaps the accelerating impetus of the public's acceptance of his scientific expositions have convinced him that it is no longer necessary to guffaw and wiggle his ears to attract attention.

It has been a long time since that was necessary for Asimov even in science fiction. His undeniable ability as a story teller, plus his three major contributions—the three laws of robotics, the concept of an all-human galactic culture, and the technique for combining the detective story with science fiction—insure him a prominent place in the history of science fiction.

THE END

(cont. from page 58)

defend home, flag and mother!

We'll probably get around to that. It's the normal attitude to take after vandalism. It's the human way.

But as of now, our only thought is to slink away.

ON our abandoned Martian landing field there hangs a man's discarded spacesuit, suspended from the desensitized prongs of a Come-to-me tower. It is stuffed with straw filched,

no doubt, from packing cases which brought out so many more delicate, sensitive, precision instruments than we take back.

Although we have not been entirely irresponsible in our headlong flight back home.

We do bring back some of what we took out; the more valuable of the instruments. We have been most selective in this.

The only coarse, insensitive, unfinished instrument we bring back—is man.

THE END

If we dare to dream at all, dream daringly. That's what Planetary Engineer Bova seems to be saying in this essay—the last of a series—on the ways by which man may someday colonize . . .

The Alien Worlds

By BEN BOVA

IN the first two articles of this series we saw how men might live and work on the Moon, Mars and Venus. In this final installment we consider such alien worlds as Mercury and Jupiter, which are so inhospitable that perhaps not even all our present scientific knowledge can assure us a foothold on them.

Let's look first at the physical conditions on our objectives: Mercury, the planetoids, and the outer planets. The individual environments of each determine the problems that must be faced, and the usefulness of the planet to man—which in turn determines how much man is willing to spend to conquer the environment. Table 1 (see page 69) shows the gross physical characteristics of the planets in question. (We will make the same basic assumption that we did for the planetary engineering of

Mars and Venus: that thermonuclear fusion power plants are available for rocket propulsion and electrical power generation.)

The Uniqueness of Mercury

BECAUSE of its unique combination of small size, proximity to the Sun, "locked" rotation, and accessibility from Earth, Mercury may well turn out to be the most useful and available planet in the solar system, second only to Mars. Surprisingly, even though Mercury is nearly twice as far from us as Venus, round trips to Mercury will actually be less expensive of rocket energy than round trips to Venus. This is because Mercury, with its low gravitational pull, has an escape velocity of only 2.2 miles per second in contrast to Venus' 6.3 and Earth's 7.0. A round trip to Mercury, in-

cluding soft landing, liftoff and return to Earth would require about 25% less rocket energy and propellant than a similar mission to Venus.

Mercury is difficult to observe because of its closeness to the glare of the Sun, and because it keeps one face always pointed toward the Sun—a "locked" rotation as the Moon is "locked" to the Earth. The perihelion temperature at the sub-solar point has been estimated at 700°F: high enough to melt lead, but actually a hundred degrees *lower* than the measured temperature on Venus' surface! The darkside of Mercury must be the coldest place in the solar system. A temperature of -425°F has been estimated, less than 40 degrees above absolute zero.

If the physical conditions on Mercury appear formidable, so do the reasons for setting up permanent manned operations there. Mercury offers astronomers a close-up base for intensive studies of the Sun. True, rocket vehicles could get even closer to the Sun than Mercury's 36-odd million miles. Still, from the surface of the planet the Sun would appear more than twice as large and nearly nine times brighter than it looks from Earth. And just as the Moon is superior to an orbiting space station, Mercury can be superior to a manned spacecraft close to the

Sun. The planet will have its own natural resources. Oxygen is bound to be found in its rocks, and water may well lie frozen on the darkside. A permanent manned base, largely self-sufficient, could be set up on Mercury in much the same manner that Moonbase will be built. Astronomers could then spend as much time as necessary studying the Sun instead of being limited by the supplies that can be stored aboard a spacecraft. No doubt manned probes will be sent spiralling in much closer to the Sun, but they will be supplied, controlled and perhaps even built at Mercury Base.

Astronomers will not be the only scientists interested in Mercury. Geologists and chemists will want to study the high-temperature conditions on the brightside. Physicists will be eager to investigate the cryogenic world on the darkside. The science of ultra-low temperatures has already led to revolutions in propellants, superconducting magnets and even medical research. What newer ideas will arise when man has a cryogenics laboratory that is a few million square miles wide?

If current assumptions about conditions on Mercury and Venus are correct, it may be easier to survive and build a highly-self-sufficient base on Mercury than on our closer, but more in-

hospitable, "sister" world. After all, the surface temperature of Mercury seems to be lower than that of Venus. And Mercury is airless, a positive advantage (believe it or not) over the sand-laden, superhurricane-force winds of unbreathable gases that may well exist beneath Venus' clouds.

The experience of building Moonbase should be enormously helpful in setting up a similar underground base on Mercury. In fact, if a site is chosen near one of the poles on the brightside, the surface temperature should be no higher than about 300°F; not too much more than the 240°F maximum found on the Moon. The base would probably be built near the terminator, the line that divides the night side from the dayside. Since the planet wobbles slightly in its orbit, the terminator shifts a few hundred miles in the course of Mercury's 88-day-long "year." This gives rise to the so-called Twilight Zone. "Twilight" is hardly the proper word. Since Mercury is virtually airless, the Zone would either be in dazzling sunshine or blind darkness. The sudden and repeated shifts of ground temperature may have produced some highly interesting—and dangerous—thermal erosion in the area of the Zone. The area may be criss-crossed with crevices and chasms: no

place for large-scale construction!

Mercury does offer one source of power that cannot be duplicated elsewhere in the solar system. Most of man's engines simply convert heat into mechanical energy. The bigger the temperature difference between the high-temperature and low-temperature ends of the engine, the more power can be produced. Mercury offers a temperature difference of some 1100°F between its permanently bright and permanently dark sides. Engineers probably will not rest until they have developed a heat engine on Mercury beyond the wildest dreams of their Earth-bound brethren.

Iron Mountains in the Sky

PROPERLY speaking, the planetoids should not be included in a discussion of planetary engineering. These chunks of rock and metal orbiting between Mars and Jupiter are unlikely to be the permanent homes of men from Earth. Yet the planetoids could be immensely important to planetary engineers, especially those who will try to transform Mars into an Earth-like world.

The planetoids have been called "mountains floating in space." Some of them are more like islands a few hundred miles across. But most of them must

be on the order of a mile or so wide, a good size for a mountain. Like the mountains of Earth, the planetoids seem to be rich in natural resources: iron, nickel, magnesium, aluminum, silicon, carbon, sulphur. Thus they could become the solar system's most important source of heavy raw materials: a single five-mile-diameter planetoid of the nickel-iron variety would contain a mass of nearly 20 million *million* tons. More iron than mankind has used since the dawn of history!

Inevitably, there will come a day when a large percentage of Earth's natural resources have been consumed, and it will be cheaper and easier to send "miners" to the planetoid belt than to dig deeper into Earth's crust. For the colonists on Mars the planetoid belt may well represent a source of raw materials completely unavailable on their planet, and too expensive to import from Earth. With small electrical rockets, pieces of planetoids can be sent remotely from their natural orbits into trajectories that will end in satellite orbits around Mars. For a slight investment in retrorockets, the pieces can be soft-landed on the Martian surface. This would be much cheaper than lifting the same tonnages of raw materials from Earth and bringing them to Mars.

Scouting out the most promising planetoids and sampling their mineral wealth will no doubt be done by automated probes, similar to the SURVEYORS and PROSPECTORS now being readied for doing much the same job on the Moon. The probes used in the planetoid belt, though, will be bigger, much more sophisticated, and capable of touching down on hundreds of planetoids before needing refueling.

The probes could leave radio beacons or some other form of signal to guide the human "miners" to the richest planetoids. Getting the metals and other raw materials off the planetoid and into the proper trajectory for Mars or Earth (or Venus or Mercury, for that matter) seems to be a job that will require intelligent men. At this stage of the man-machine competition, it does not seem likely that machinery could handle such a task by itself.

Men will live in the planetoid belt on a temporary or perhaps even semi-permanent basis. It should not be necessary to carve out extensive bases for them. Most likely the ships they come in will be adequate as quarters for their stay in the belt. Raw materials from the planetoids can be converted into life-supporting supplies aboard the ships. The only advantage a planetoid might

offer would be as protection against radiation during periods of intense solar activity. However, the ships that ply the belt will probably carry equipment to generate magnetic fields that will shield the men inside from solar flare radiation.

The Satellite Worlds

AFTER the planetoids, the next objectives in space would most logically be the moons of Jupiter and Saturn. The two giant planets themselves are so utterly foreign to us that it should take man some time before he has the technological ability to probe below their gaudy-colored cloud decks.

Table 2 (page 69) gives the sizes and orbital radii of the known moons of Jupiter, Saturn, Uranus and Neptune. Note that the four Galilean moons of Jupiter (the ones with names), three of Saturn's satellites, and one each of Uranus' and Neptune's, are respectable worlds in their own right. Io and Europa are about the size of our own Moon, while Ganymede, Callisto, Titan and Triton are as big, or even bigger, than Mercury. Titan and Ganymede have atmospheres of their own—mostly of methane. The smaller moons are probably nothing more than frozen puffs of (water) ice, methane and ammonia. The larger ones may pos-

sess rocky cores, but are probably covered with layers of ice.

There are two potential uses for these moons. First, they could supply raw materials for the inner planets. We have seen that water will unquestionably be the most precious resource to be found anywhere in the solar system. These moons probably contain considerable amounts of frozen water that could be shipped to the inner planets, much as the metals and minerals of the planetoids could be. Methane and ammonia, between them, offer the elements hydrogen, carbon and nitrogen. Hydrogen is useful as propellant for nuclear rockets. Carbon and nitrogen will be valuable for fertilizers and other chemical uses. You remember in our discussion of Mars in the last article we even considered the possibility of using nitrogen and carbon (combined with oxygen to make carbon dioxide) to fill out the thin atmosphere of Mars, at the same time that oxygen is being pumped into the Martian air after being liberated from limonite in the soil.

The second obvious use for these moons, the larger ones in particular, will be as sites for permanent bases from which to study the giant planets. The prime requirement for bases so far from home and—more important—so far from the Sun, is the

TABLE 1. THE ALIEN PLANETS

	<i>Mercury</i>	<i>Jupiter</i>	<i>Saturn</i>	<i>Uranus</i>	<i>Neptune</i>	<i>Pluto</i>
Distance from Sun (Earth = 1)	0.39	5.20	9.54	19.19	30.07	39.46
Diameter (miles)	8000	86,000	71,500	29,400	28,000	3600 (?)
(Earth = 1)	0.88	10.97	9.03	3.72	3.88	0.45 (?)
Mass (Earth = 1)	0.04	318.35	95.30	14.53	17.26	?
Density (Water = 1)	3.8	1.84	0.71	1.56	2.47	?
Surface Gravity (Earth = 1)	0.27	—	—	—	—	?
Gravity at top of Cloud Deck (Earth = 1)	—	2.65	1.17	1.05	1.23	—
Atmosphere	none	Hydrogen,* Helium,* Methane, Ammonia	Hydrogen,* Helium,* Methane, Ammonia	Hydrogen,* Helium,* Methane	Hydrogen,* Helium,* Methane	?
Temperature (°F)	700 (max.) —450 (min.)	—220 (avg.)	—240 (avg.)	—260 (avg.)	—275 (avg.)	—400 (?)
Velocity of Escape (Earth = 7 miles/sec)	2.2	37.82	22.75	13.89	15.87	?
*Deduced from theory						

TABLE 2. MOONS OF THE OUTER PLANETS

<i>Planet</i>	<i>Satellite</i>	<i>Diameter (miles)</i>	<i>Mean Distance from Planet (miles)</i>
JUPITER (moons numbered in order of discovery)	V	100	112,600
	I (Io)	2300	261,800
	II (Europa)	2000	416,600
	III (Ganymede)	3200	664,200
	IV (Callisto)	3200	1,169,000
	VI	100	7,114,000
	VII	40	7,292,000
	X	15 (?)	7,350,000
	XI	15 (?)	14,040,000
	VIII	40	14,600,000
	IX	20	14,880,000
	XII	15 (?)	15,000,000
SATURN	Mimas	370	115,000
	Enceladus	460	148,000
	Tethys	750	183,000
	Dione	900	234,000
	Rhea	1150	327,000
	Titan	3550	749,000
	Hyperion	300	920,000
	Japetus	1000	2,210,000
URANUS	Pheobe	200	8,034,000
	Miranda	150	80,800
	Ariel	600	119,100
	Umbriel	400	165,900
	Titania	1000	272,000
NEPTUNE	Oberon	900	264,000
	Triton	3000	229,000
	Nereid	200	5,000,000

need for reliable power. Controlled thermonuclear fusion power will be more necessary than ever to supply heat and light for men and plants, and power for digging and building.

The bases built on these moons will at first be largely underground, although large surface domes will be needed to observe the planets nearby. Raw materials should be no major problem. Hydrogen for the fusion power plants and oxygen to breathe should be abundant on these moons, as will be most of the other lighter elements. Heavier metals and minerals may be brought in from the planetoids. If nuclear power is cheaper than rocket transportation costs, these bases may transmute one element from another in nuclear reactors, rather than import the needed elements.

One intriguing problem is the matter of heat insulation. Consider an underground base carved into a crust of solid ice, which may well be the "ground" of these moons. The base is heated to terrestrial shirtsleeve temperature. What happens to the surrounding ice if this heat leaks out of the base for months, or years? The problem will be not only to keep the base warm inside, but to keep the ice cold outside. Either that, or have the base eventually float away!

In time, man may discover

new and better ways to control his environment. Some non-material way of containing heat—similar to the way a magnetic field can contain an electrically-conducting gas—may eventually be invented. Science fiction writers for years have talked about "energy screens" that could absorb, reflect, focus, or do almost anything with solar energy. Some day physicists may learn to do just this. With energy screens and the power to run them it might be possible to place an impalpable shield around an entire planet or moon and trap solar energy until the surface is heated to comfortable terrestrial temperatures. Of course, if the body in question consists of a few-mile-thick layer of ice, the whole idea becomes questionable. Certainly, energy screens will be invaluable on Mercury where they can create a bubble of Earth-like conditions on either the bright-side or darkside. With or without energy screens, though, the moons of the outer planets can be reached and largely self-sufficient permanent bases set up. Then comes the biggest adventure of the entire solar system: the giant planets themselves.

The Jovian Worlds

THE inner worlds of the solar system are called terrestrial because they somewhat resemble

Earth. Even Mercury, weird as it is, is more Earth-like than any of the giant planets. The giants are often called the Jovian worlds, after Jupiter, the largest of them all, the closest to Earth, and therefore the first one we will reach.

The single word that best describes the Jovian planets is *alien*. For example: It would take almost 11 Earths to span Jupiter's diameter, and more than 318 Earths to equal its mass. Yet Jupiter has such a high percentage of light elements that it could nearly float on water—if you can envision a pool 100,000 miles wide! Saturn, slightly smaller than Jupiter and less dense, actually *would* float on water.

What we see of Jupiter is the top of a thickly-clouded atmosphere, composed for the most part of hydrogen and helium. The clouds themselves are predominantly methane and ammonia, both positively identified by spectroscopes on Earth . . . and both highly poisonous to man. The gravitational field at the top of the cloud deck is 2.64 times Earth's sea-level gravity, and increases steadily with depth. The cloud-top temperature averages around -220°F .

What lies below the clouds can only be guessed at. The powerful gravitational field and the effects of increasing pressure probably

combine to turn the atmospheric gases into a liquid state a few hundred miles below the clouds. There might not be any solid surface on Jupiter, merely a gradually-thickening density until liquids finally become solid. Possibly Jupiter contains a deep layer of ices, and beneath that a core of rock and metal—or solid hydrogen. It is also possible that the planet has internal sources of heat, so that it might be warmer beneath the clouds than our Earth-based measurements indicate.

There is no way of knowing for certain until rocket probes are sent below Jupiter's clouds. The clouds themselves are in turbulent motion. This is because the planet, even though nearly 11 times larger than Earth, spins on its axis in slightly less than 10 hours! This frantic rotation whips Jupiter's atmosphere into super-powerful winds that stream across the planet's gigantic disc. The same effect has been seen on Saturn and, to a lesser extent, on Uranus and Neptune.

Despite the forbidding conditions on the Jovian planets, it seems inevitable that man will try to penetrate the clouds of ignorance surrounding them and explore them first-hand. If so, we must consider the possibility of setting up bases—at least temporarily—within Jupiter's murky, turbulent, frigid, gas-liquid at-

mosphere. If man can develop the techniques to survive and explore on Jupiter, the other Jovian planets should present no great problems since they are smaller and their gravitational fields lighter. It is Jupiter's heavy gravity that presents the biggest obstacle to manned operations there.

Incidentally, several scientists have raised the possibility of life existing on Jupiter based on liquid ammonia rather than our familiar water. If so, permanent manned bases will be vitally important to the stream of biologists and biochemists who will want to study Jovian life forms. (The chances for life on Jupiter were discussed in the July and September, 1962, issues of *AMAZING*.)

A manned exploration of Jupiter would probably resemble an underwater expedition more closely than a feat of astronautics. The base headquarters would be a giant, self-contained structure floating freely in the gases-turned-liquid. Its shape would be determined by aerodynamic—or rather, hydrodynamic—considerations. The base probably could not remain at a fixed location. It will drift with the super-powerful winds and currents of Jupiter. Communications, therefore, will be a critically important problem. From this base men will leave on explora-

tory missions, using ships something like a combination between a dirigible and submarine. It is extremely unlikely that a single man could venture outside his ship in anything like a pressure suit. One-man submarines will probably be the smallest piece of equipment used on Jupiter.

To counteract the ever-present pull of 3 *g*'s or more, the ships and the entire base headquarters must be filled with liquid. It might be water, although an even denser liquid would be better. As long as men are on—or in—Jupiter they will remain fully immersed so that they can in effect be weightless. This seems to be the only way available (today) to get around the planet's strong gravitational field. Thus the crew will live like skindivers. They would breathe pressurized air just as deep-diving swimmers do to help equalize the pressure outside their bodies. Teams of skindivers, in the past year or so, have spent weeks living in special underwater quarters under conditions somewhat similar to those that might be expected in the Jovian expedition. A French group, led by the famous Capt. Jacques-Yves Cousteau, has even set up semi-permanent quarters at the bottom of the Red Sea.

Can men from Earth do useful work, or even think straight, in a submerged existence on Jupiter?

If not, then our only hope for penetrating Jupiter's clouds lies with scientific advances only dreamed of today. Perhaps some day in the coming century man may learn to control gravity in the same way he now controls electromagnetic radiation: focus it, reflect it, amplify it, shield against it. After all, gravity is a wave phenomenon that apparently emanates from the atomic nucleus. Physicists are beginning to understand the structure of nuclear particles. Perhaps the payoff of nuclear research will be not only unlimited power from fusion but full control of gravity as well.

Pluto

DISTANT Pluto is such a question mark that it is hard to say anything significant about it. Pluto's orbit is known within a good degree of accuracy. But the physical characteristics of the planet are almost completely

Planetary Engineering Today

THE first timid steps toward full-scale planetary engineering are actually underway at this moment.

NASA is sponsoring studies to prove the feasibility of extracting water and oxygen from lunar rocks. The Air Force has for some time been financing experimental "Mars farms" where terrestrial plants are grown under simulated Martian conditions.

open to question. It seems to be about the size of Mercury. Its mass has been guesstimated at about the same mass as Earth. If so, its density would have to be higher than that of osmium, the densest known substance on Earth. No other planet comes even close to such a density.

Is Pluto a superdense world? With a steady temperature of at least -400°F , who can say what physical conditions might exist there? One point seems likely. Pluto is so weird that scientists will probably want to explore it even before they go to Uranus and Neptune. There is always more to learn from the unusual than the commonplace. Incidentally, a fusion-powered rocket that can accelerate at a steady $1\ g$ to the halfway point and then decelerate at $1\ g$ the rest of the way could reach Pluto from Earth in about 18 days.

(Continued on following page)

There are a few million calculations that can be performed on required air pressures, temperatures, etc., for Venus and Mars. Of course rocket probes to the Moon and planets will soon be sending back the fundamental information needed to begin the solid planning of Moonbase—and of the operations that will eventually be set up on Mars and Venus:

We have not discussed the possibilities of using comets for raw

(Continued on page 125)

NO STAR IS SAFE

BY P. F. COSTELLO

Spender thought Denton was up to something and he was right. Nothing very important, though. Just a little plan to blow the Solar system out of the universe.

THE girl without any clothes on came out of the wall again. This was the fourth time in three days. Spender Kelly opened his blood shot eyes and told her to go away. She smiled and shrugged and obeyed. Then the turbaned eunuch peeked mischievously down through the chicken-wire netting that served as a ceiling for the stinking four-foot cubicle that masqueraded as a room. Spender snarled at him. The snarl was enough. The eunuch vanished in a spasm of fright.

Spender closed his eyes, then opened them again to look at the bottle on the stand beside the bed. It was empty. He scowled at it and pulled himself to a sitting position. It hadn't been bad stuff, really; not bad for a man who

cared nothing about his stomach or his sanity, and neither item concerned Spender. The bottle-store clerk had said it was brewed on Mars and that the wholesaler had called it fluke water. He had touted it as a gentle poison in that it was unique in its delirium tremens effects. it didn't stave off the DTs, but it made them interesting; no purple elephants wearing green swimming suits; no creeps or monsters; only the beautiful things that lurk in everyone's subconscious and need only to be conjured up. Great stuff for anyone who wanted to forget his past the easy way. None of this had interested Spender particularly. Only the price had fascinated him. The fluke water was the cheapest booze in the place,



and a little bit went a long way. His bottle had lasted four days, but now it was gone and so was Spender's money.

But the effect was evidently still upon him because, when he turned his head, he saw another beautiful girl standing by the bed. More beautiful, than the one he'd just shooed back into the wall. But not as naked. In fact this one was completely dressed; a startling red head wearing the latest ensemble on the space travel *motif*; clinging, practical, expensive.

Spender rubbed a hand over his week-old growth of beard and said, "Go away, honey. Fade out. Evaporate. Dressed or stripped, you still don't interest me."

But this one refused to obey. She remained where she was and kept her beautiful green eyes on Spender. She wore an expression of both contempt and concern, mixed to a degree that made it impossible to tell which emotion dominated. When she spoke, her words were biting. "I suppose that means women follow you even into this cess-pool."

"Insult noted," Spender said. "Sorry I said what I did. Case of mistaken identity. Now please go away.

After you lend me ten dollars, that is."

"For more booze, I suppose."

"What else? And to prove I don't intend to waste it on anything silly, you can go out and buy the bottle yourself."

The girl's expression now changed to one of pity, and there was bewilderment in the quick gesture of her lovely hand. "Spender—why? In God's name—just tell me that! *Why*? Then I'll go away and let you alone if you tell me to. But I've got to know."

Spender Kelly turned with weary exasperation. "Cassie, you're a good kid. I like you. I'll go further than that and say you'd be the one for me if things were different. But they aren't. Things are—are the way—oh, hell! Just drop ten bucks on the table and get out of here."

She tried again. "Spender, please listen to me. It's not too late. No matter *what's* happened to you—it isn't too late. Let me prove it. I got a present from my uncle since I saw you last. The most beautiful little space boat you ever laid eyes on. A Chalmers; a ten-ton pleasure cruiser."

Spender did not bother to reply.

"We'll go out and set an orbit, Spender. Just the two of us, and you can rest and get yourself straightened out. Please, Spender."

"Honey—I ask only one thing. Get your pretty little nose out of my business and stay the hell away from me. Is that too subtle, or am I making my wishes clear?"

The girl's lovely face blazed with color. Contempt brightened her eyes. "All right, you—you pig! Go ahead and wallow in your filth and see if I care. Go ahead and—" She stopped and her smile was icy. Then she said, "In fact I'll help you. All you want is bottle poison so I'll get you one. I'll help you into hell with my blessing." She stepped to the stand and picked up the empty bottle. "Is this your favorite brand of slop?"

"Hell no. As long as you're buying, make it something good."

She put the bottle under her arm and her voice was a sob. "Very well. I'll accommodate you!"

"That's my baby," Spender muttered fervently, and lay back on the dirty cot. "Cassie Marno—girl scout. A drunk's best pal."

With the mist of liquor drifting out of Spender's brain, his mind went, as

usual, back into the past—back to the memory he had striven, through whiskey, to avoid. He was again on the ship in deep space. Again the lethal rays seared out and fried the men who had been his friends and did not deserve to die.

Then a sound opened Spender's eyes and there was someone else in the room. But not Cassie Marno. A man this time; a prim, disapproving man with a briefcase under his arm. "Who the hell are you?" Spender growled. "And what do you want?"

"My name is Arthur Freeman, and I've probably made a mistake."

"Then why hang around?"

"Let's make sure I'm mistaken, first. I'm looking for a man named Spender Kelly."

"I'm Spender Kelly. But you've still made a mistake."

"I represent the Tri-Star Detective Agency."

"I never heard of them."

"If you're the Spender Kelly I'm looking for, you most certainly have."

"Look—all I want is to be left alone—"

"Two years ago," Arthur Freeman went on, firmly, "a Mr. Spender Kelly came to our agency and hired us to locate an individual named Ramsey Denton."

Spender's eyes opened sharply. They focused on the man as Spender came slowly to a sitting position. "Go on," he said.

"Then you remember?"

"I remember."

Freeman looked about him, "There appears to have been some changes since—"

"Never mind the personal observations. I supposed you people had failed long ago."

"You paid us a great deal of money," Freeman said, stiffly, "and we are a reliable agency. We were placed in the awkward position, however, of having to relocate our client after gathering the information he requested."

"Get to it, will you?"

"Very well. We learned that a man named Ramsey Denton appeared before a secondary branch of the Interplanetary Security Board in Stockholm, Sweden and was cleared of criminal suspicion hinging around the loss of the Queen Bee, a space ship. The investigation took place about eight months ago."

"The clever bastard!" Spender muttered. "He framed a clearance some way and now he can never be touched on the charge again."

"That's quite correct. We traced the man from that

point and have spent the intervening time in trying to report to you."

"You lost him again?" Spender asked sharply.

"Indeed not. Denton has been very active in the meantime but we kept track of him. He obtained backing for some space venture and is now hiring labor for work on a satellite."

"What satellite?"

"It is designated as V5 in the Leo sector."

"What kind of work?"

"Labor—skilled and unskilled. We haven't been able to learn much about the project itself, but it appears to involve construction of some sort."

"Where is Denton hiring this labor?"

"Not Denton. He has changed his name to Arthur Wentworth. He is basing his operations in St. Louis—near the Mississippi Space Port. He calls it Wentworth Enterprises."

Spender Kelly's eyes had brightened. A perceptible vitality had returned to him. He sat on the edge of the bed, his hands gripped together, his eyes fixed on Freeman with intense concentration. "You've done a good job," he said.

"Thank you," Freeman

said, primly. "It has been entirely satisfactory?"

"Entirely."

"Then you will have no objection to signing this receipt?"

"None whatever."

"Freeman took a sheet of paper from his briefcase, laid it on the stand, and handed Spender a pen. Spender signed the paper. Freeman folded it and put it back in the briefcase with obvious satisfaction. "That concludes our business," he said. "If you ever have further need of our services, please call on us."

Spender grinned. "I'll even recommend you to my friends."

Freeman took up his briefcase and left.

Freeman was hardly out the door before Spender Kelly was digging under his cot. He brought out a cheap suitcase held together by a length of cord tied around the middle. A change had come over him now, and he worked with grim decision. He broke the cord around the suitcase and took out a change of clothing and a jar of shaving cream. Acting as though he had ten minutes to catch a train, he smeared the cream on his beard with savage fin-

gers. Then he scarcely gave its chemicals time to work before he jerked the sheet from the cot and wiped away his week-old growth of beard.

A small cracked mirror showed his face to be somewhat pale but still more deeply tanned than that of the average planetbound citizen.

He was fastening his black tunic when the door again opened. Cassie Marno stood there.

She carried a package under one arm and stood frozen with astonishment. "What—what on earth?"

"What's wrong with you?" Spender growled.

"Wrong with *me*? Good heavens! That's my question. What happened to you?"

"I changed my clothes. Is that such a surprise?"

"Why—why under the circumstances, I'd say, yes."

"Something came up. You said you had a new space boat!"

Cassie was still thunderstruck. "Yes—I have."

"Want to take a ride?"

Her eyes brightened hopefully. "You mean—what I said about—?"

"Not exactly." Spender's eyes moved to the package Cassie was carrying. "What have you got there?"

"A fresh bottle. Fifteen

minutes ago it was all you wanted out of life."

Spender grinned, but there was a softness in his expression. "Cassie, you're a champion!" He took two steps and lifted the bottle from her hands and dropped it on the bed. He put his own hands on her shoulders and looked down into her eyes. "Why have you done it, Cassie?"

Her eyes dropped from his. "Well, it was all you wanted—all I could do for you—"

"I don't mean that. I mean all these months—these last two years. Following me around. Haunting me. Trying to straighten me out." There was a moment of silence while he crooked a finger under her chin and lifted her head. "How many times in the last two years have I insulted you, Cassie—chased you away?"

"Pretty often."

"And you always came back. Why?"

The girl's expression said it was a silly question; that any fool should know why. "Because I love you."

He studied her face for a long moment. "I've always thought of you as a kid, Cassie. I remember—you were there first time I walked into your father's office to sign on for the *Queen Bee* run. You were sitting on the

corner of his desk. You looked about fourteen."

"I was nineteen and you paid me no attention whatever. That other man was with you—Ramsey Denton—the one who was lost on the *Queen Bee*."

Spender turned away, bent down, and closed the suitcase. "Oh yes—Denton." But his mood and tone had changed.

"I remember how I cried when the report came back—cried for you," Cassie said. "Then—when they found you on that asteroid—a million to one chance—"

"Uh-huh. But that's all over now. This space boat of yours—where is it?"

"Down at the port."

"How would you like to hop over to St. Louis?"

"St. Louis? Why do you want to go there?"

"I'll tell you on the way." Spender kicked the suitcase under the bed. Then he paused. "Maybe I'll need those old clothes," he muttered. He bent down and retrieved the suitcase and retied the cord. "Let's go."

As he opened the door, his eye caught the bottle lying on the bed. "Wait a minute." He picked up the bottle and opened it. He poured a drink into the glass on the stand

and handed it to Cassie. He held the bottle aloft. "Toast," he said.

Cassie raised her glass. "A toast to what?"

"To destruction," Spender said, and tipped the bottle to his lips.

Cassie said, "An odd toast, but I'll drink to it if you say so." She emptied the glass.

Spender corked the bottle and set it behind a section of broken wall behind the bed. "For the next unfortunate," he said.

"But how will he find it there?"

"A drunk, honey, can find a bottle anywhere within half a mile. It's an instinct they develop. Let's go."

"Man!" Spender said, an hour later. "They're sure building them these days. This boat could almost make the Jupiter run, and they call it a pleasure cruiser!"

"It carries Out-Belt restrictions," Cassie said, "but Uncle Will told me the same thing."

"He's the one who gave it to you?"

"Yes, but it wasn't a present exactly. You see Dad sold out Marno Limited after the *Queen Bee* was lost. Then, six months later, he died."

"I remember," Spender

said a trifle bitterly. "I heard about it but I didn't go to the funeral. I was drunk at the time."

"Dad left everything to me and Uncle Will handles my money. It's very good of him. I don't know the first thing about money. When I want anything, I tell him. I asked him for a ship and recommended this one."

"He doesn't worry about your running around alone in it?"

"There isn't any danger. It has the new Mono-Robot control. You couldn't crash it if you wanted to."

"Things have changed a lot in two years," Spender muttered. "The last time I was in space, you could crash them without half-trying."

Twenty minutes after take-off, Cassie said, "You were going to tell me what this is all about; why we're going to St. Louis."

"No time, now," Spender grinned. "We're almost there. I'll tell you later."

But after dropping down onto a blast pit in the Mississippi port, Spender left the ship and strode swiftly to the port hostel where he signed for two rooms. Cassie followed him. He'd brought the battered suitcase with him, and

the clerk looked at it with suspicion. But no room clerk ever born could stand in the way of Spender Kelly when he wanted something. He sent Cassie to her room and went to his own. Ten minutes later, he appeared at her door looking pretty much as he had when Cassie had found him in the Arizona flop house. He had no beard now, but it had been replaced with smears of dirt he'd gotten off the outer window sill in his room.

Cassie gasped. "Good heavens! Here we go again."

Spender grinned. "Not exactly, hon. I've got a little job to do. I want you to wait here for me. Won't be gone long but I'll have to hurry. It's getting late."

"Where are you going?"

"A place called Wentworth Enterprises."

"Why?"

"I understand they're hiring labor for work in deep space."

"Spender! You're not going to—"

"Leave you? Not right now. I'll be back."

"But why are you going to this place?"

"To get track of a man who calls himself Wentworth."

"But—"

"No time, now, honey. Wait for me."

He went out and got into a cab.

The cab stopped in front of a long low building that had obviously been thrown up as a temporary shelter. Even though the sun had just dipped out of sight, there was still a line of men moving slowly into the place.

The cab driver turned and said, "This is it. Some planetary building project I understand. Are you going to sign on, Mister?"

"Maybe," Spender said and left the cab and moved in long strides toward the building.

Spender Kelly realized that what he contemplated was murder in the eyes of the law, but he gave that fact scarcely a thought. In his own mind, he was an executioner.

He approached the doorway and stepped to the end of the line. The man ahead of Spender, was a tall, sad-faced individual with a sallow complexion. He turned and said, "You signing on?"

"No," Spender said, "I've got a date with the Secretary of Space-Commerce. I'm meeting him here."

The sallow man wasn't offended. If anything, he grew more sad. "That's good. Real funny. A joke. Me—I just hope they'll take me on. Got

me a touch of lung rot on Mars last year, building the Cross-Pole Tunnel, and it kind of puts me on the sidelines. I understand this outfit ain't too particular, though. They seem to be taking anybody that can walk."

"Where's the project?"

The other shrugged. "Nobody seems to know exactly. They give out a satellite location in Leo I think, but that don't mean nothing."

"What kind of work?"

"Construction it looks like."

The line had moved into the building now, and Spender's eyes were busy. The interior was bare except for a table at the far end toward which the line stretched. The flimsiest sort of a temporary hiring hall. There were two men seated at the table before which the applicants stood. Two others stood behind them; hard looking, stiff faced men who were obviously something other than construction men. Denton was nowhere in sight. Spender felt a keen disappointment. However, he asked himself, how much luck had he expected? Walking straight to Denton was, after all, a lot to hope for.

The line moved swiftly, each man being handled with dispatch. So far as Spender

could see, none were rejected. This in itself, was off-key. On an average, one man in thirty had been found capable of functioning under conditions found beyond the earth's surface. Industrial labor tables said so, and they were put together by scientists who knew their business. But here, man after man was being signed up with no physical examination whatever.

Now it was Spender's turn. He shuffled to a halt in front of the table, put a hang-dog expression on his face and stared sullenly at his feet. The young man taking down information, eyed him with cold impersonality. "Name?"

"William Henderson."

"Age?"

"Thirty-one."

"Had any construction experience?"

"Lots of it."

"In space?"

"No—all earthside, but—"

"That's all right. Want to work in space?"

"What planet?"

"Does it matter? One's the same as the other."

The young man uttered this falsehood with a casual wave of his hand and said, "Twenty-five dollars a day from blast-off to return. Three-year stretch."

So that was how they were

hooking them, Spender thought. Ten dollars a day was rated as high. Fifteen exorbitant. Therefore, men didn't inquire too deeply when offered twenty-five.

"Well, what about it? We haven't got all night."

"I'll take it," Spender said. Anything to gain time.

"Sign here."

Spender took the pen and was bending over the table when a sharp voice said, "Just a minute."

Spender tensed. He knew that voice. He turned. Ramsey Denton stood facing him. Denton hadn't changed much, except the mask of sincerity had been discarded. There was a grim arrogance in his face now. He was flanked by three men—evidently bodyguards. He said, "What are you made up for, Spender? A masquerade party?"

Spender stared at Denton, mumbled, "What you talking about? My name ain't—ain't what you said. I'm just a guy down on his luck, looking for a job."

"You've no idea how far down on your luck you are, Spender. You've come to the end of your string."

"I don't get you, Mister. You keep calling me—"

"You're a dead man, Spender."

Denton had stepped forward to keep his voice from carrying. He moved within Spender's reach, and Spender knew further masquerading was a waste of time. Nothing was left but a try at the suicide run.

He dived at Denton and caught him by the wrist. He turned under the wrist swiftly, bringing Denton to his knees. He moved in to lock his knee under Denton's chin and exert the necessary pressure. With a few seconds' leeway, he knew he could break Denton's neck. He'd seen it done by Martian *hongo* experts and had studied the technique.

But Denton and his bodyguards were on the alert. Within a scant moment of success, Spender felt the impact of a fist driven in behind his right ear. The point of a boot caught him in the groin and his hold was broken. He slumped to the floor with darkness closing around him. He didn't go completely out, however, and as his head cleared, he saw Denton standing well away from him. Denton was rubbing his neck and speaking to the three bodyguards who held Spender to the floor.

"This man is a maniac,"

Denton said in a loud voice. "Take him to the police station immediately." The three men hauled Spender out of the building. Denton followed.

Outside, Denton's act for the benefit of onlookers was dropped. He looked at the sagging Spender and said, "That was as stupid a trick as I ever saw. Did you think I wouldn't recognize you?"

Spender mumbled curses and allowed his weight to hang on the two men who held him.

"I made a mistake, not killing you on the *Queen Bee*," Denton said. "Along with the rest. But I have a touch of sentimental weakness sometimes. Foolish of me. I thought maybe you'd have sense enough to stay away from me and thus stay alive. Evidently you haven't. Now you're through."

Spender cursed some more—hung with his knees bent, his head lolling. Denton stepped forward and hit him in the face. There was no particular savageness behind the blow. It was more of a contemptuous gesture. Denton said, "You've got two hours to dispose of him. We're taking on the last few men and then we'll blast off. Be back in time or we'll leave you."

He turned and walked back to the building.

One of the men got behind the wheel of the car while the other two dumped Spender on the floor in back. They got in after him and sat down, using Spender's body for a footrest. They said nothing.

The car circled the space port and turned in the direction of the river. If they went all the way, Spender knew he had about fifteen minutes. Obviously they intended to kill him and throw him in the water. There was nothing to do but wait.

The car stopped and one of the men got out. "This'll do," he said. The second man followed, grinding his heel into Spender's back. As he stepped from the car, one foot on the ground, Spender was ready. He took the man by the ankle and twisted, bracing his feet against the far door for leverage. The man pivoted, lost his footing and screamed as his leg broke near the hip joint. The first man turned in surprise but he was too slow. Spender catapulted from the car and brought him down with a flying tackle. He rolled instantly in order to bring the man's body between himself and the driver, using him as a shield while he broke his

neck with a single twist of his hands. Either surprise or lack of defensive knowledge against *hongo* sent the man to quick death.

The driver was out of the car now, and charging around the rear. He had a gun in his hand and Spender had no place to go; no place except straight into the gun. He charged, set for the slug's impact. The gun snarled and flamed and Spender had his hands on the driver. He shoved a knee between the man's thighs and got leverage on his neck in the same motion. Bone snapped. But the gun snarled again—the desperate action of a dying man—and Spender went down under the smash of a descending hammer.

Spender drifted back to consciousness. He moved his head and a wave of sharp pain cleared his mind. A voice said, "Careful, darling. Don't move," and Spender opened his eyes to see Cassie bending over him.

He blinked and recognized the hostel room he'd taken at the port. "How in hell did I get here?" he muttered. He raised his arm and looked at his watch, then dropped the arm in a hopeless gesture.

Cassie was stroking the

bandage on his head. "I followed you. I was afraid you would get in trouble when you left, so I tagged along and saw the men put you in the car. I followed them but I lost them for a while and when I got to the river I thought all four of you were dead. I hauled you into the car and brought you back here."

Spender looked around. "No cops?"

"I didn't call the police. I was afraid they would arrest you."

Spender reached over and took her hand. "Cassie, what would I do without you? Every move I make puts me deeper in hock to you. How will I ever get out?"

"Do you want to get out?" she asked softly.

"But I'm no damned good, baby. I've flunked again. I walked in wide open and got slapped down. I went in to kill Denton and I didn't even inconvenience him. I'm a washout."

"Did you kill those three men?"

Spender closed his eyes. "If they were dead I guess I killed them. They were Denton's shock troops. He told them to get rid of me."

"Then you acted in self defense. I'm glad."

"You thought I'd just killed them to be doing something?"

"I didn't know what to think."

"But you covered for me."

"I'd have done that anyhow. But I'm glad you killed in self defense."

"That's not much credit. I went to that place to murder a man."

"You were going to tell me what's behind all this."

Spender lay back and looked bleakly at the ceiling. "That's right, but I never got the time, did I?"

"No."

He grinned without humor. "Well, I guess I've got plenty of time now that I've messed it up. I've got all the time there is."

"Then tell me."

"I was captain of the *Queen Bee* as you remember, with Denton my second in command. Denton was my best friend. That shows how stupid I was. Since long before the *Queen Bee* flight, he'd been planning something—something he needed the ship for. Halfway out, he struck."

"I thought the ship was hit by a meteor."

"That was what I told them, but it wasn't true. Denton walked into the ward room one day and murdered seven men—the officers who

weren't in his confidence. He walked in and blasted them into ashes before they could move."

Cassie stared at Spender as though she couldn't conceive such a thing. "Then the *Queen Bee* wasn't lost?"

"Of course not."

"Why didn't you tell the police all this when they found you on the asteroid?"

Spender passed a weary hand over his face. "Because I swore to get him myself. I had visions of Denton twisting out of it some way. And even if he was convicted I was afraid some clever space lawyer would get him off with a prison term and if he landed in jail I wouldn't be able to get at him."

"Then you've been hunting him for two years?"

"Not exactly, hon," Spender smiled and the smile was full of self-recrimination. "I started out like an avenging fire—hired detectives to locate him. But he was smart—he stayed out of sight—and I began to think that possibly the ship *had* blown up after he marooned me on the asteroid. I sensed my own failure and began to see visions of those seven men dying—men I could have saved."

"That's absurd. You didn't

know. How could you have saved them?"

"I didn't tell you all of it—exactly what happened. You see, Denton came down the second-deck alleyway that led to the ward room with the gun in his hand. He opened the door to the ward room and at that moment I came out of the control cabin and stood not ten feet from him when he raised the gun to start firing. I—I didn't stop him."

"It would have been impossible!"

"That isn't true. I was scared, Cassie. For five or ten seconds—the crucial seconds—I stood there frozen with fear."

"Not fear, darling. Surprise. You were never afraid of anything."

"I was scared stiff. I saw the possibility of that gun being turned on me and I couldn't move."

"I still say it was surprise. The shock of realizing what Denton was really like."

"It was cowardice, baby. Only ten seconds of it maybe—but that ten seconds meant death for seven innocent men. I began seeing their faces in my dreams. I began drinking to chase the faces away—"

"Why didn't Denton kill you?"

"I don't know. He probably figured I was as good as dead if he marooned me. I think he just wanted me to die harder than the others."

There was a moment of silence while Spender stared at the ceiling. Then Cassie said, "Don't you think you ought to tell the police now, Darling?"

Spender did not seem to hear. "I've got a hunch," he said, "that Denton is swinging a big deal of some kind. He must have hired a thousand men. That's a lot of men for space work."

"A ship blasted off an hour ago. Maybe it was his."

"It was. I heard him say he was leaving in two hours. That was back at the hiring hall."

"Why don't you tell the police what you know and give it up. Let them take over? You need a rest. A long rest."

Suddenly Spender came erect. "Wait a minute! With all those men, he couldn't have used a fast ship."

Cassie's eyes widened. "No! If you're thinking what I—"

"Baby, your cruiser could overtake anything in the B class, and he's got to be using a freighter."

"But it's absurd, Spender. If you did overtake Denton

in space, what could you do? My cruiser isn't armed."

Spender was up from the bed, reaching for his tunic. "You're right, hon, but there's something I've got to do. Wait for me here. I'll be back."

"But you're not able—"

He grinned. "I'm plenty able. You just sit tight." He took her in his arms and kissed her; not a hurried kiss, but one with something in it to remember. When he drew back, Cassie blinked. "*Mister Kelly!* You wouldn't fool a poor girl, would you?"

"Not a chance."

"When will you be back?"

"Two hours at the most."

Spender kissed her again, and left. As he hurried out through the lobby of the hostel, he felt a definite sense of guilt. But he put it resolutely aside. He would settle with Cassie later. In the meantime, nothing was going to stand in his way. Cassie would be sure to understand—he hoped.

He ordered supplies at the port, paying a premium rate for immediate delivery. He saw the gear stowed aboard and headed for Control. A smooth-cheeked career lad waited to be of service, his hair neatly brushed, his uniform spotless.

"What ship went out last?" Spender asked.

The youth looked at his schedule. "The Centaur. An hour and ten minutes ago."

"Where was it bound for?"

"What is your reason for asking?"

"No reason. Just curiosity. I saw the blast and figured it was a pretty big ship."

"It was. A freighter. But I can't give you its course unless you're inquiring in an official capacity."

Spender shrugged. "Just curiosity—as I said. I want clearance for the cruiser on Number Nine ramp."

The young man consulted his chart. "*The Magnolia?* You've only been in four hours. Has it been serviced?"

"They're just finishing up."

The young man pulled a form out of the chart. "Did you sign her in?"

"That's right. I'm the pilot."

"Sign here, please."

Spender signed, forcing himself to do it casually.

"I'll have to have the co-pilot's signature too."

"We don't carry one. It's an automatic job. Mono-robot."

The young man checked the classification. "Oh, I see. Very well. I'll signal the tower

Check with them when you're ready to blast."

Spender whistled a lazy tune as he left the office. Once outside he stopped whistling and headed for the cruiser at a dead run.

Twenty minutes later he was in space. He grinned.

Then the grin froze as a voice hit his ear. "Will you have a cup of coffee?"

He whirled. Cassie Marno was standing behind him with a tray.

"What the hell are you doing here?" Spender barked.

"It's fresh and hot," Cassie said. "I just made it."

Spender eyed her with beligerence. "We're not going back, Cassie. I'm not giving up this last chance."

"I'm not asking you to. I'm just sore at you for trying to get away from me."

He turned suddenly and walked to where she was standing. He put his hands on her shoulders. "Baby, you're here and that's that. I hope you won't regret it."

"All right. Now that we've settled that, how about telling me what you have in mind by way of a plan."

"First, we've got to locate Denton's freighter."

"And how do you propose to do that?"

Spender's grin was mirthless. "Wait about forty-eight hours, and I'll show you."

And the next day she had another question for Spender. "I wish you'd tell me exactly what you intend to do even if you find Denton. All I can figure, is that you'll be killed."

"I'll cross that bridge when I come to it. I know I can't do anything until I do find him, so I'll concentrate on that first."

Cassie flared in anger. "Spender, you can be the most aggravating man! Haven't I done enough to prove—"

"—That I can't get along without you? You certainly have, baby. And some day I'll make it all up to you." He took her in his arms and kissed her. This diverted her mind.

The following day, Cassie came into the control room to hear Spender calling out the position of the ship over the radio transmitter. He repeated it three times. Then his, "Come in, please," brought a response from a far-off Asteroid Scout Station: "Taurus Blue Five, here. Over."

"Distress call," Spender said. "The cruiser *Magnolia* drifting off-course with dead tube. Is there any help in this sector?"

"Hold on. Will check."

Three minutes later the thin voice came over again. "Freighter, *Alaskan Lord* on far side of sector. You could probably contact."

"Fine. Have you got its wave-length?"

A few moments later, Spender grinned in triumph. He wrote the wave down in micro-cycles, and said, "Thanks a lot. We'll make out."

"If you don't locate them, report back on the universal band."

"Will do. Thanks. Out."

Spender turned to Cassie. "You wanted to know how I'd locate Denton? This is it. Watch." He turned to the radio and set the dials. A faint *beep* came through. He adjusted the dials and it grew louder. "We keep right after him on his radio beam until we get a *blip* on the radar screen. Then we've got him."

Cassie sighed. "You mean then he's got you. Why don't you call for help, Spender? Why must you do everything yourself?"

"It's my job," Spender said, grimly. "He's got to answer to me."

Cassie knew, by now, the futility of arguing. She gestured in despair and went out to make coffee.

For indistinguishable days and nights, they hung grimly on the radio *beep*. Spender took the long shifts, and Cassie filled in when he had to have sleep. But no dot appeared on the radarscope and Spender became more morose by the hour. "We should be on him now. A freighter can't be that fast."

"Maybe it's equipped with special tubes," Cassie suggested.

"Even so, with the men and equipment he must be carrying—"

"But why be so impatient? As long as you're on his beam, you've got to make contact—unless he keeps on traveling forever."

"We'll get him."

"You need some sleep. I'll take over."

Spender stretched out on the cot and Cassie took his seat at the radarscope. The monotonous *beep-beep, beep-beep* from the radio beam filled the cabin. But save for erratic meteorite material, the scope remained clear.

Spender turned and twisted on the cot until Cassie looked his way. "Can't you sleep?"

"Afraid not. Guess I've been getting too much sleep."

"That's a laugh."

"You know—I've got a feeling this deal of Denton's

is bigger than anything we've got the least idea of."

"Do you think it's illegal?"

"I think anything Denton is involved in would be legal."

"It's obviously construction work and this is free territory. I can't think of any such work that *could* be against the law out here."

"Denton is clever. He plays for big stakes. During the Polaris Wars, he took Hellot stronghold without losing a man."

"They were the green non-conformists, weren't they?"

"Right. They had a few good scientists and they put a ray barricade together that no one could pierce."

"Denton conquered them?"

"Uh-huh. With one of the oldest tricks in the world. A trick he borrowed from the ancients. He built a huge plastic horse. Five tons of red horse that held the green men spellbound while he lowered it from a ship right into the middle of their camp. I guess they thought it was a gift or something, but they stood there flat footed while he opened the horse and cut the resistance right out of them. He got a citation."

Cassie shuddered. "It sounds terribly cruel."

"It was, but it won the war."

"I wonder why he stole the *Queen Bee*."

"I think it was only a part of his plan. I doubt if it's the only ship he got his hands on."

"But where could his money have come from? It costs plenty to finance a project that takes all the men he hired."

Spender yawned. "Maybe he found an angel. A beautiful angel like you. Anybody with your kind of money could finance a pretty big deal."

"Who'd be so foolish?"

"How much money *have* you got, Cassie?"

"I don't know. I leave all that to Uncle Will." Cassie moved a dial and the volume of the *beep* increased. "Why don't you try to get some sleep?"

"Okay."

But Spender had scarcely dozed off when Cassie was shaking his shoulder. "Wake up, darling! Something's happening. The scope's active!"

Spender bounded to his feet and leaped across the cabin to the scope. A *blip* glowed in blue on the round, curved screen. Spender's eyes lighted. "We made it!" he cried.

But Cassie's face wore a puzzled expression. "Yes, but it looks—"

Spender frowned. "What the hell! That's not a ship!"

"That's what I meant. It's far too positive."

"It's an asteroid at the very least. A big one. Or maybe a satellite."

"I think so."

"But what's an asteroid doing with a radio wave?"

"Maybe—"

"I get it!" Spender said. "There's a receiving station on the satellite and it operates on the same wave length as the ship we've been following. The ship brought us into its port."

Cassie showed dismay. "Then we're too late."

"Not by a long shot!" Spender said, grimly. "We've got to get some photos. Can you operate the camera?"

"I don't know."

"There's nothing to it. I'll set the range and we'll go in on the dark side and use infra-red. We'll have to stay far enough away to make them think we're meteorite material until we get the set-up."

Spender crossed to the opposite side of the cabin and cleared the photo port. He threw the switch that brought the camera up from its crib

and then set the finder. "I'm putting it at fifteen hundred miles. I'll ease the ship in under manual and give you the word to hit the switch."

Thirty seven minutes later, Spender said, "Now!" and the infra-red film began winding behind the telescopic eye of the camera. And ten minutes after that, they were looking at the negatives on the pilot cabin screen.

"Good heavens! What's going on down there?" Cassie exclaimed.

The picture revealed was one of great activity. The body upon which this activity was taking place was a good hundred miles in diameter, Spender estimated, and was obviously equipped with an artificial gravity core because the figures moving about wore only light resistance suits and oxygen globes.

There were three huge construction projects in process and at least five thousand workers swarmed like ants over the satellite. There was a space port and a cluster of buildings from which all the action appeared to stem.

"What are they doing?" Cassie asked.

"I wish I knew," Spender replied. "But at least this answers a lot of questions—and poses plenty of new ones."

"What do you mean?"

"The ship we were following didn't bring Denton's first load of workers. He was only adding to his force—or filling in the gaps."

"You mean they keep quitting?"

Spender's grin was bleak. "Not voluntarily. Look." He pointed to some of the figures on the screen. "Those men are guards. There are several hundred of them scattered through the ranks. They're heavily armed and watching for trouble."

"Why that adds up to—"

"—To slave labor," Spender said, grimly. "And another thing. See those pits and low buildings just there?"

"Yes. What are they?"

"Cremation ovens—chemical tanks—for disposing of dead bodies. Those workmen are the scum of earth. Denton takes any man willing to come and that point had me puzzled. Now I see why. He works them until they drop dead and then brings in a new bunch to fill the gaps. Cheap that way. He doesn't have to pay them."

"Spender! It—it makes me sick to even think of it."

"But at least you know now what kind of a man we're dealing with. Denton is carrying some plan forward and

he won't let even hell itself stop him. Look!"

At that moment a truck lumbered into camera range. It moved toward the cremation ovens. It stopped and several men got out and climbed into the back and began throwing objects onto a moving belt that ran into the one of the buildings.

Cassie gripped Spender's arm and turned pale. "Spender!" she gasped. "Those—those things are—dead bodies!"

"The afternoon load, I presume," Spender said through set teeth. "Don't look, Cassie. It will make you sick."

She smiled wanly and turned away. "I guess I *have* seen enough."

Spender continued to stare at the unreeling film. "But what in damnation is he *doing*? What are those projects? They're not far enough along yet to show anything definite, and yet—" He turned suddenly away from the screen. "I've got to go down there, Cassie. I've got to find out what's going on."

"Spender! No! I won't let you."

He hardly heard her. He was studying the clock and making mental computations. "There's approximately a

two-and-a-half-hours of night down there. And I've got about an hour and a half to go down and meet it. I can make it if I hurry." He ran from the pilot cabin and Cassie followed him.

She was still protesting when he fastened the last buckle on his light resistance suit and picked up the plastic oxygen globe. But Spender paid no attention until he had need of her to help with the escape hatch. Then he turned and grinned and took her in his arms. "Now take it easy, honey. Nothing's going to happen to me. I'm not going to get in any trouble. I'm just going down to look around."

She eyed him with anxiety. "Promise me that you won't try to kill Denton. Not yet. If you go lumbering in, you'll be killed sure."

"I promise. And I won't get in trouble. I've got this." He patted the holster at his side in which nestled the latest thing in controlled heat tubes. "I can cut a man in two with this."

"When will you be back?"

"Five hours at the latest. And when I come back, I'll have a plan. Keep the ship circling in this orbit so I can pick it up without trouble."

"I know I can't stop you, Spender, so I guess the least

I can do is send you off with my prayer."

"Good girl. What would I do without you . . ."

Five minutes later, he was hurtling through darkness toward the mystery satellite.

Spender came down gently on a smooth rock surface behind the cremation ovens. He dropped and lay flat for several minutes until he was sure no one was coming to investigate. Then he moved toward the group of buildings he and Cassie had spotted on the infra-red film. As he passed the crematorium, an opportunity presented itself and he was not slow to take advantage of it. An armed guard came slowly around the corner, holding his short, ugly spray gun in one hand while he adjusted his oxygen flow with the other. He saw Spender and scowled. He was in the act of barking out a challenge when Spender hit him—squarely in the belly with the toe of a heavy boot swung with the whole weight of his body behind it. The guard gagged and his eyes bulged as he doubled over in agony. He pitched forward to his knees and Spender's foot came down on the back of his helmet, smashing the contorted face to the ground. Spender

der grabbed the falling gun and then threw the weight of his body on the foot, smashing the guard's helmet. The man writhed over on his back, gasping now—dying from lack of oxygen. Spender did not wait for this process to bring death. As he would smash a bug, he brought the heavy butt of the gun down on the man's skull, crushing it. As brutal as the act was, it was still a more merciful death than the other.

Spender pushed the body against the wall and waited to see if the incident had been noted by anyone in the vicinity. No voice came out of the semi-darkness to challenge him, so he picked up the guard's body and carried it around to the moving belt. He dropped it in the chute and it disappeared from sight.

Now he was in a better tactical position. He carried a gun and could possibly pass for a guard. The solo-jet unit he wore was small and inconspicuous and was entirely invisible to anyone approaching him from the front.

He put the gun under his arm and moved toward what appeared to be the administration building. It was dark except for three lighted windows along its twenty-window length. A guard lounged

by the door, leaning against the wall, his gun hanging lazily in the crook of his arm. Spender, alert without appearing to be, moved slowly toward him. As he emerged from the gloom, the guard turned his head. "Boring night," Spender said, casually.

"You said it." The guard yawned. "Wish I could duck inside for a smoke."

"The boss around?" Spender asked.

The guard yawned. "Uh-uh. He went spaceside about an hour ago. Man! I'd like a cigarette."

"Me too," Spender said. "Tell you what. Let's spell each other. You duck inside and grab one. Then it's my turn."

The guard didn't hesitate long. "All right. Keep your eye out. I'll rush it."

Standing alone by the door, Spender studied the contour of the closest construction project. Even in this early stage, there was something familiar about it. He scowled, telling himself he should know what it was. What could Denton be building, with slave labor, here on this bleak, lonely lump of rock? And who would finance such a project? Big money was involved and big money always wanted a

sure return. Some mining project? A new and cheaper way of refining metal? Spender puzzled over the problem until the guard returned.

"All right, chum. It's your turn. Make it fast, though, will you?"

Spender hurried through the door while the guard covered the area with his eyes. Once inside, Spender moved through the first door available. A long room stretched away in front of him, and even in the dim light, he knew what went on here. A vast chemistry lab. Chemistry. Did that strengthen his theory on mining? Possibly; possibly not. He walked through the room and out the other end. A hallway, with doors giving off on either side. This looked like living quarters.

Spender tried two doors and found them locked. The third one opened. A light was on but the room was deserted. Spender looked swiftly about. There was expensive luggage at the foot of the bed; a gold comb and brush set on the table. He bent down to look for a name on one of the suitcases. He found a name.

It took a great deal to shock Spender Kelly, but he bent over the suitcase for a long time, unable to believe what

he saw. His first clear thought was: *How will I tell Cassie?*

He straightened and turned toward the door, and the second revelation came as he was returning to the entrance of the building through the long room filled with drafting tables. A blue-print caught his eye. He picked it up and carried it to the window for better light. What he saw froze him to the spot. Not a blue-print but a sketch, probably done before the project had been started. A sketch of the huge satellite with three spires protruding from it in strategic arrangement. Spender knew what they were.

Jet tubes.

Spender's mind worked swiftly and he did a complete about-face in his planning. If his new hunch on Denton's plan was any where near accurate, the destruction of Denton was too big a job to be entrusted to one man. The risk of failure was too great. It was no longer a matter of stopping one man. It was a matter of stopping absolute catastrophe. The magnitude of the revelations appalled Spender, experienced though he was. *No star is safe*, he thought, *no world is beyond his reach*.

Spender knew he had to get

back to the *Magnolia* quickly. He went back to the entrance and looked out. The guard was alone. As he went out the door, he made the mistake of turning for a backward glance. Instantly, the guard's voice came in over his helmet speaker. "What's that thing you've got on your back?"

Spender turned to conceal it. "What thing?"

"Oh, sure. A jet unit. Say! What the hell are you doing with—?"

These were the last words he ever spoke. Spender's small ray gun was out and spitting. It cut a thin, white-hot line across the guard's chest, slicing his life away. As he dropped to the ground, Spender was already adjusting his controls. He shot away from the satellite with a force that tore at his joints and strained every ligament in his body. As he moved toward the *Magnolia's* orbit he looked back at the asteroid. It was more than that, now. It was a sinister threat to all humanity.

He strained the unit to its uttermost, racing toward the *Magnolia*, and in a short time, the outline of the ship loomed ahead. He adjusted a dial on his helmet and called Cassie. There was no reply, but as he

arced in, the escape hatch slid open and he broke in.

The hatch closed and he removed his helmet, he heard the hiss of oxygen filling the hatch. He stripped off his suit while waiting for the inner door to release. It moved away from the circular opening and he stepped through into the ship.

As he did so, a sharp object was pressed into his back and a voice grated in his ear, "All right, Spender. Don't move or I'll cut you in two."

He cursed himself for blundering in. Another mistake in a long line of mistakes. He should have realized Denton could conceivably have spotted the *Magnolia* on radar as a ship rather than meteorite material.

The scene was stark before him. Cassie tied to a chair with one of Denton's bodyguards standing close by. Denton himself holding the gun in Spender's back.

Denton came slowly around to face Spender. Denton now held two guns; his own and the one he'd lifted from Spender's holster. He said, "You're beyond doubt the most persistent fool I ever met, Spender. You keep popping up with the persistence of a moth around a light tube.

Evertime I meet you I'm in a position to kill you. You're stupid, Spender."

There was a band of adhesive around Cassie's mouth. Above it her wide eyes pleaded with Spender. He said, "Take that gag off Cassie, Denton, or I'll make a try for the gun in your hand. And maybe I'd win."

"You're an idiot," Denton snapped, "but there's no further need of the gag. I used it so she wouldn't warn you over the radio." Denton motioned to the guard. "Take it off."

As soon as her voice was free, Cassie said, "I'm sorry, Spender. He tricked me into opening the port. He—"

Denton waved an impatient hand. "That isn't important. The important thing is what I'm going to do with you." He was looking at Cassie as he spoke.

Spender said. "Go ahead and kill me, Denton. But give Cassie a break. She isn't involved in this. It was all my idea."

"On the contrary—she's very much involved. She presents a problem." He turned his attention to Spender, now. "Did you enjoy yourself, gumshoeing around my satellite?"

Spender clenched his fists. "What are you trying to get

away with down there, Denton?"

Denton smiled. "Obviously you are too stupid to find out for yourself, and I see no reason to enlighten you."

"Then I'll tell you. You're putting three jets into that rock pile. When you're finished, it will be a weapon—the largest projectile ever devised. With the jets you can steer it anywhere you want to. If you aim it at Earth, you can slow it up and ease it through the atmosphere so it won't burn up. Then you can pick up enough speed in an orbit to crack Earth wide open—smash it completely."

Denton continued to smile. "You're smarter than I thought you were. I didn't think you'd be able to figure it out. But you're right. You've outlined the potentials of the project perfectly. It will never be used, however."

"You're trying to imply that you have human instincts?"

"Not in the sense you mean. But I have no intention of splitting any planets. I'm merely using the projectile as a threat to back up an ultimatum. Earth will capitulate, of course. They'd be foolish not to. I merely intend to take them over—not destroy them."

Spender took a deep breath and judged the distance to Denton's gun. "This deal cost you a lot of money."

Denton's eyes flicked to Cassie, and Spender knew what went through his mind—why he considered her a problem. At that moment, the radio crackled and a muffled voice came through. Denton motioned to the guard. "Work the hatch for a boarder," he said. There was a frown on his face, and while he was on the alert for any movement from Spender, it was easy to see that his mind was otherwise occupied. While the guard waited for the oxygen to fill the escape hatch, Denton said, "I think you'd better take her into another room—hide her." He nodded toward Cassie. Then, as the guards approached her, he changed his mind. "No. Leave her where she is. The issue must be faced squarely."

Then the guard threw the switch, the door opened, and a man entered the ship. He had already stripped off his helmet. For a moment there was silence. Then Cassie cried, "Uncle Will!"

He was a short, stout man and upon his face was a mixed expression of bewilderment and sullenness. And in the set

of his eyes and the cut of his mouth, there was inherent greed. He turned accusingly on Denton. "What is this? You didn't tell me, she was here. What are you trying to do?"

Denton eyed the man with a mixture of calculation and contempt. "I saw no reason for hiding her from you. After all, maybe the girl has a right to know where her money went."

Cassie was stunned. "Uncle Will! You've been financing this—this criminal with *my* money."

William Marno decided to brazen it through. "It's over and done with, Cassie. The die is cast. There's nothing you can do about it."

Denton was looking at Spender Kelly. "You don't seem surprised."

"I'm not. I found Marno's room down in your building. I found his name on a suitcase."

Denton shrugged. "Well, it doesn't matter." He turned to the fat man. "The important thing is this, Marno. They've both got to die."

Marno's mouth opened in consternation. "Cassie? You're going to kill Cassie? Why should you do that?"

"We've come to the point where we can no longer take

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chances. If we were ready to move, it would be different, but we've still got several month's work here. A woman on a satellite with several thousand men is too great a danger.

"She knew nothing about all this!" Spender cried.

"That's beside the point. She knows now. She dies when you die."

The guard shoved his gun hard into Spender's back. "Don't make any silly moves, mister."

Spender's fists tightened as Denton said, "In a few months, we'll have the jets finished. They will turn this asteroid into a projectile, just as you surmised. Using it as a threat, I can take over any planet I wish to. I'll start with Earth."

Will Marno said, "But why should Cassie have to die? Can't we keep her isolated?"

Denton looked at him sternly. "Marno, I'm the leader of this project. My word is law. I'll have no interference. My judgment is final."

Marno's shoulders sagged. "I suppose you know best."

"All right," Denton snapped, turning to the guard. "Marno and I will leave. After we're gone, kill the girl and Kelly. Then set

the automatic to take this ship into far outer space and follow us. Report to me in my office."

Then Will Marno, moving swiftly for a man of his build, dove at the guard, twisted the gun around, and pressed the guard's own finger down on the switch. The guard died instantly with a look of only faint amazement on his face.

Spender leaped forward and was upon Denton before the latter knew quite what was happening.

Will Marno stared at the crumpling guard, seemingly appalled at what he'd done.

He said, "Denton, I'm—I couldn't let you kill her. If you hadn't said she had to die, everything would have been all right. But I couldn't let you kill her."

Spender said, "Cut Cassie loose, Mr. Marno, and take her out into the escape lock."

Marno stared at Spender for a moment, seemingly dazed. Then he walked to Cassie's chair and began loosening her bonds.

"Stop it you fool!" Denton yelled. "Do as I told you."

Marno helped Cassie to her feet. "Come," he said.

Denton's eyes widened. His nostrils flared. "Come back! You're not going to leave me at the mercy of this madman! He'll kill me—kill me—"

The escape hatch closed and Denton and Spender were alone in the cabin with the body of the dead guard. Denton cringed. "Spender—now listen. We can make a deal. You and I, Spender. We'd make a great team. We could rule the universe!"

Spender threw Denton across the room, twisting him as he did so. Denton screamed as he flew through the air. He hit the wall and fell to the floor with his arm twisted at a grotesque angle. "You broke it!" he bab-

bled. "You broke my arm!"

Spender moved across the cabin toward him. Denton cringed. "I can't stand pain, Spender! Please! I can't stand pain!"

Five minutes later, the shrieking, babbling Denton was finally dead.

A week later, Spender and Cassie stood beside the main building on the asteroid looking up into the sky. A fleet of government ships hovered there, and a small pilot shell was bringing the commander down to take over.

But Cassie and Spender had their eyes trained in another direction—off to the left, where a faint dot was vanishing into space. It was the *Magnolia* with a single passenger aboard—William Marno.

Cassie said, "Thank you for letting him escape, darling. Somehow I just couldn't—"

Spender pressed her hand. "It's all right, Cassie. He wasn't a bad guy in comparison to Denton. And we'll never see him again."

Tears came into Cassie's eyes. "Darling—why do things have to be—like they are?"

He kissed her and she was content.

QUESTION OF COMFORT

By LES COLLINS

The Gravity Gang was a group of geniuses—devoting its brilliance to creating a realistic Solar System for Disneyland. That was the story, anyway. No one would have believed all that stuff about cops and robbers from outer space.

MY JOB, finished now, had been getting them to Disneyland. The problem was bringing one in particular—one I had to find. The timing was uncomfortably close.

I'd taken the last of the yellow pills yesterday, tossing the bottle away with a sort of indifferent frustration. I won or lost on the validity of my logic—and whether I'd built a better mousetrap.

The pills had given me 24 hours before the fatal weakness took hold; nevertheless, I waited as long as I could. That left me less than an hour, now; strangely, as I walked in the eerie darkness of an early morning, virtually deserted Disneyland, I felt calm. And yet, my life depended on the one I sought being inside the Tour building.

I was seeking a monster of

terrible potential, yet so innocuous looking that he'd not stand out. I couldn't produce him, couldn't say where in the world he was. Nevertheless he was the basis, the motivation second only to mine. I took the long, hard way—three years—making him come to me.

Two years were devoted to acclimitization, learning, and then swinging this job: just to put the idea across.

Assigned to Disneyland Public Relations in the offices at Burbank, I'd begun with the usual low-pay, low-level jobs. I didn't, couldn't mind; at least I had a foot in the right door. Within six months, I reached a point where I could present the idea.

It had enough merit. My boss—35 years' experience enabled him to recognize a good idea—

took it to his boss who took it to The Boss.

Tomorrowland is the orphan division of Disneyland, thrown in as sop to those interested more in the future than the past. My idea was to sex up Tomorrowland: Tour the Solar System.

Not really, but we'd bill it that way. The Tour of the Solar System Building was to be large. Its rooms would reproduce environments of parts of the System, as best we knew them.

I'll never forget the first planning session when we realists were underdogs, yet swung the basic direction. By then, the Hollywood Mind had appeared. The Hollywood Mind is definitely a real thing, a vicious thing, a blank thing, that paternalistically insists It knows what the public wants.

There was general agreement on broad outlines. Trouble began over Venus.

"Of course," said one of the Minds, "we'll easily create a swampy environment—"

I burst out with quiet desperation: "May I comment?"

The realists were churning. Right there, sides were being chosen. I let all know my side immediately.

"Venus is hot, but it's desert heat. Continuous dust storms with fantastic winds—"

"People'd never go for that junk," interrupted the Mind. "Everyone knows Venus is swampy."

"Everyone whose reading tastes matured—no further than Edgar Rice Burroughs!"

The mind, with a if-you-know-so-much--why-aintcha-rich look, sneered, "How come you know all about it?"

Speechless, I spread my hands. This joker was leading with his chin, forcing the fight. I had to hit him again; if I lost, I lost good. "A person," I said slowly and rhythmically, "with normal intelligence and a minute interest in the universe, will keep step with the major sciences, at least on an elementary level. I must stress the qualification of normal intelligence."

The Mind, face contorted, was determined to get me. I was in a very vulnerable spot; more important, so was the idea.

Mind began an emotional tirade, and mentally I damned him. It couldn't have mattered to him what environment we used, but he was politicking where he shouldn't.

There was silence when he stopped. This was the crux; The Boss would decide. I held my breath.

He said, "We'll make it hot and dusty." The realists had won; the rest climbed on the bandwagon but quick; and the temple was cleansed.

It was natural—because at the moment I was fair-haired—for the project to become mine. God knows, I worked hard for it. I'd have to watch the Mind, though; he would make things as difficult as possible.

However, he'd proved he was the one person I wasn't seeking. One down and 2,499,999,999 to go.

Within a few days, a new opposition coalition formed, headed by the Mind. Fortunately, they helped. I'd hesitated on one last point. Pushed, I gambled the momentum of the initial enthusiasm would carry it.

Originally the plan was a series of rooms, glassed off, that people could stare into. There was something much better; engineering and I spent 36 hours straight, figuring costs, juggling space and equipment, until the modification didn't look too expensive—juggling is always possible in technical proposals. For the results, the cost was worth it. I hand-carried the proposal in.

Why not take people *through* the rooms? We could even design a simulated, usable space-suit. There'd be airlock doors between the rooms for effectiveness, insulation, economy. No children under ten allowed; no adults over 50. They'd go through in groups of 10 or 11.

Sure, I realized this was the most elaborate, most ambitious concession ever planned. The greatest ever attempted in its line, it would cost—both us and the public. But people will pay for value. They'd go for a buck-and-a-half or even two; the lines of those filing past the windows, at 50 cents a crack, would also bring in the dough.

They bought it. Not all—they nixed my idea of creating exact environmental conditions; and I didn't insist, luck and Hollywood being what they are.

From the first, I established a special group to work on one problem. They were dubbed the Gravity Gang, and immediately after, the GG. I hired them for the gravity of the situation, a standard gag that, once uttered, became as trite as the phrase. The Tour's realism would be affected by normal weight sensations.

The team consisted of a female set designer—who'd turn any male head—from the Studio, a garage mechanic with 30 years' experience, an electronics engineer, a science fiction writer, and the prettiest competent secretary available. I found Hazel, discovering with delight she'd had three years of anthropology at UCLA.

As soon as they assembled, I explained their job: find a way to give the illusion of lessened gravity.

Working conditions would be the best possible—why I'd wanted the women pretty—and their time was their own. I found the GG responded by working 10 hours a day and thinking another 14. They were that sort.

I couldn't know the GG was foredoomed to failure by its very collective nature; nor could I know, by its nature, the GG meant the difference between my success and failure.

The opposition put one over;

we'd started referring to the job as Tour of the System Project. Next day, it was going the rounds as TS project. Words, words, and men will always fight with words.

Actually, the initials were worthy of the name. The engineering problems mounted like crazy. Words, words, and one of them got to the outside world. Or maybe it was the additional construction crew we hired.

One logical spot for the building was next to the moon flight. The Tour building now would be bigger than first planned, so we extended it southeasterly. This meant changing the roadbed of the Sante Fe & Disneyland R.R. It put me up to my ears in plane surveying—and gave me a nasty shock.

I looked up at someone's shout, in time to see a ton of cat rolling down the embankment at me.

What we were doing was easy. Using a spiral to transition gradually from tangent to circular curve and from circular curve to tangent. Easy? Yeah. Sure.

If this was my baby, I'd damned well better know its personality traits. I was out with the surveyors, I was out with the construction gang, I was out at the wrong time.

As the yellow beast, mindless servant of man, thundered down, I dove for the rocks. Thank God for the rocks—we'd had to import them: the soil in

Orange County is fine for oranges, but too soft for train roadbeds.

Choking on the dust, I rolled over. The cat perched, grinning drunkenly, on the rocks. The opposition or an accident? Surely the Mind wasn't *that* desperate. But I was; I had to keep the idea alive, for myself as well as completion of the original mission.

Several million hands pulled me out; several million more patted away the dust. Motionless, I'd just seen the driver of the cat. Seen him—and was sorry.

He stood tall but hunched over; gaunt, with pasty skin, vapid eyes, and a kind of yellow-nondescript hair.

It wasn't the physical characteristics, very similar to mine, that bothered me—once after an incomplete pass, I'd been told by a young lady that I was a "thin, sallow lecher." I was swept by waves of impending trouble, more frightened of him than of the opposition in toto. Then, relieved, I realized the man wasn't the one I was expecting.

Back in my office, I wasn't allowed the luxury of nervous reaction. Our spacesuit man wanted an Ok on design changes. Changes? What changes? . . . Oh, yes, go ahead.

A materials man wanted to know about weight. I told him where to go—for the information.

A written progress report from the GG briefly, sardonical-

ly, said: "All the talk about increased costs and lowered budget has decided us to ask if any aircraft, missile, or AEC groups have come up with anti-gravity. It'd be a lot simpler that way. Love and kisses."

I shrugged, wrote them a memo to take a week off for fishing, wenching, or reading Van Es on the Pleistocene stratigraphy of Java. I didn't care, as long as they returned with a fresh point of view.

Things were hectic already, less than four months after we'd started. And we hadn't much to show, except a shift in the road-bed of the SF & D RR. The opposition, growing stronger each day, could sit back and rest the case, with nothing more than a smug, needling, I-told-you-so look.

The day finally came when we broke ground for the building. It was quite an achievement, and I invited the GG to dinner. I'd been drawn to the bunch of screwballs—the only name possible—more and more. Maybe because they were my brain-child, or maybe because lately they were the only human company in which I could relax.

The Hotel is about a half-mile south of Disneyland. I arrived early, hoping to grab a ginger ale. Our set designer, Frank—christened Francis—caught me at the door.

"Wanted to buy you a drink. This is the first time we've met socially."

That was true; it was equally

true something bothered her. Damn it! Trapped, I'd have to drink. We ordered, and I mulled it over. Waited, but she said nothing.

The drinks came. I shook several little, bright-yellow pills from the bottle, swallowed them, then drank. Frank cocked her head inquisitively.

"If you must know, they're for my ulcer."

"Didn't know you had one."

"Don't, but I'll probably get one, any day."

She laughed, and I drank again. I should do my drinking alone because I get boiled incredibly fast. It happened now. One second I was sober; the next, drunk.

Resting a cheek on a wobbly palm-and-elbow, I said, "Has everyone ever said you are the most beautiful—"

"Yes, but in your present state, it isn't a good idea for you to add to that number."

I shifted to the other forearm. "Frank, things might be different if I weren't a thin, sallow lecher."

"What a nice compliment—"

"Uh huh."

"Especially since I work for you, nominally anyway—"

"Uh huh, nominally."

"Bosses should not make passes

At gals who work as lower classes."

"Uh, huh, familiar."

"But you are, and getting more so daily—"

"Uh hu—are what?" I asked in surprise.

"Thin, tired: the GG has decided you're working too hard."

"Because I don't use Vano." I grinned, having waited long to put that one across.

"Be serious and listen—"

"You listen: if I'm working too hard, it's to finish. I *must*, and soon."

"This compulsion," she paced her words, "will kill you if you let it."

"It'll kill me if I don't let it—"

"Here comes Harry."

It was time. Blearily, I fumbled with the pills, spilled the bottle. Frank helped me gather them up, as Harry arrived.

He said, a look of worry on his gaunt, gray features, "The rest of us are waiting."

Concerned, Frank asked, "Think you're able?"

"Anytime you say," I answered, in a cold-sober monotone.

She flushed, knowing I was sober, not knowing certainly if I were serious.

When we were seated, I said enthusiastically, "Chateaubriand tonight, gangsters."

The GG did not react as expected.

Dex, the electronics engineer, said quietly, "If it's steak when the ground is broken, what'll it be when the thing is finished?"

"A feast, for all the animals in the world—just like Suleiman-bin-Daoud." This, from the GG writer, Mel.

Their faces showed the same thing that bothered Frank.

Harry said, "We have something to do."

"Well, do it!" I tried weak joviality: "It can't be anything of earth-shaking gravity."

Hazel, long since accepted as a GG member, replied, "It's just that we're . . . resigned."

"What?"

"We've produced nothing in months of sustained effort. That's why we're resigning," Dex replied disgustedly.

Frank touched my arm, said softly, "We've examined every angle. With the money available, it's just impossible to give a sensation of changed weight. And we know they've been pressuring you about us being on the payroll."

"Wait"—desperately—"if you pull out, everything will go. The opposition needs only something like this. Besides, the GG is the one bit of insanity I can depend on in a practical world, the prop for my judgment—"

Harry: "Clouded judgment."

Mel: "Expensive prop."

Having grown used to their friendly insults, I sensed their resolution weakening, felt the pendulum swinging back.

The waitress interrupted with news of an urgent phone call. It was the worst possible time for me to leave. And the news I got threw me. Feeling the weight of the world, I returned.

"Can't be in two places at once," I said bitterly. "Go ahead without me; I'm leaving."

"Wait a few minutes," Mel said, between bites of steak, "we want to resign. Sit down."

"Damn it, I can't! I spoke to The Boss. I've pulled a boo-boo, but big."

"What happened?"

"Bonestell will do the backgrounds, but he has to know what rocks we're putting in the rooms. What rocks are we? Anybody have an idea what the surface of Mars looks like? God, how could I have missed that?"

"Sit down," Dex said casually, "we want to resign."

Hazel added, "You can have your rocks in 24 hours. We worked it out weeks ago. I *did* read Van Es, and Harry has prospected, and Dex knows minerals, and Mel pushed his way through Tyrrell's 'Principles of Petrology'—"

"The science of rocks," Mel interrupted, between bites of steak.

"We got interested one day." Frank's pretty, dark eyes danced.

"We want to resign," Dex repeated casually, "so sit down."

I sat.

They began throwing the ball faster than I could catch: "No atmosphere on Mercury, then no oxidation; I insist there'd be no straight metals . . . The asteroids? Ferromagnesian blocks of some kind—any basalts around here? . . . For Venus, grab a truckload of granodiorite—the spotted stuff—from the Sierra-Nevadas and tint it pink . . . Lateritic soils for Mars? You

crazy? Must have water and a subtropical climate . . ."

It hit me: a valid use for the GG, one that already saved money. Make them a brain team, trouble-shooters, or problem-solvers on questions that could not be solved.

I said, "Fine, go ahead. About your resignations—"

Mel said something indistinguishable—I'd caught him on a bite of steak.

Hazel, belligerent, demanded: "Are you asking us to resign?"

Apparently I wasn't. So they stuck, and another crisis was met. Unfortunately, by then, I'd forgotten the shock and warning I got from the cat.

Things moved swiftly, more easily. The GG took over, becoming, in effect, my staff. They'd become more: five different extensions of me, each capable of acting correctly. As a team, they meshed beautifully.

Too beautifully, at one point. Dex and Hazel were seeing eye-to-eye, even in the dark, and I worried about the effect on the others. I might as well have worried about the effect of a light bulb on the sun. They married or some such, refused time off, and the GG functioned, if anything, better. It was almost indecent the way the five got along together.

A new problem arose: temperature. We weren't reproducing actual temperatures, but the rooms needed a marked change, for reality's sake. I'd insisted

on that, and having won the point, was stuck with it. It was after 2 A.M.; I was alone in the office.

The sound of the outer door closing startled me. Footsteps approached; I hurried to clean my desk, sweeping the bottle into the drawer.

"You're up too late. Go home." Frank had a nonarguable look in her eye. "You're supposed to be getting sleep."

"I am, far more than before you guys began helping, but—"

"But with all that extra sleep, you're looking worse."

"I don't *need* any more sleep!" I said angrily, then tried diversion, "Been on a date?"

"Yes, but I thought I'd better check on you." She moved close to the desk, and I remembered the last time we'd been alone, in the bar. Now I was glad I wasn't drunk.

"What the devil are you up to?"

She pawed through the desk drawers. "Finding what you tried to hide—"

"Wait, Frank!" I yelled, too late.

"She looked at the bottle, then me, with a strange expression: a little pity—not patronizing—but mostly feminine understanding. "Soda pop? Of course. You don't like alcohol, do you?"

"No." Gruffly.

Her eyes blinked rapidly, as though holding back tears. "I know what's the matter with you; I *really* know."

"There's nothing the matter with me that—"

"That beating this mess won't solve." We hadn't heard Mel enter. He leaned casually against the door. "Terrific idea for a story."

I shrugged. "Seems to be homecoming night."

"Not quite," he glanced at his watch, "but wait another few minutes."

He was right: Harry, out of breath, was the last of the GG to arrive.

"Now what?" I asked. "Surely this meeting isn't an accident?"

Dex said thoughtfully, "No, not really, but it is in the sense you mean. We didn't agree to appear tonight. Yet logically, it's time for the temperature problem—well, I guess each of us came down to help."

What could I do? That was the GG, characteristically, so we talked temperatures.

"What I was thinking," Harry began slowly, "was a sort of superthermostat." Harry, as usual, came to the right starting point.

Frank smiled, "That's right, especially considering layout. Venus and Mercury are hot; the others, cold. What about a control console that'll light when the rooms get outside normal temperature range? Then the operator—"

"Hey! Why an operator?" Mel questioned. "We ought to make this automatic." He grinned. "Giant computer . . . can

see it now: the brain comes alive, tries to destroy anyone turning it off—"

I asked: "Have you been *reading* the stuff you write?" Funny enough for 3 A.M.

Dex said calmly, "We *can* work this—in fact, we can tie it in pink ribbons and forget it. An electronics outfit in Pasadena makes an automatic scanning and logging system. Works off punched-paper tape. We'll code the right poop, and the system will compare it with the actual raw data. Feedback will be to a master control servo that'll activate the heater or cooler. Now, we need the right pickup—"

I snapped my fingers. "Variable resistor bridge. Couple of resistors equal at the right temperature. There'll be a frequency change with changing temperature—better than a thermocouple, I think."

They looked at me as though I were butting in.

"You've been reading, too," Dex accused. "Ok, we'll use a temperature bulb. Trouble is, with this system, we'd better let it run continuously. That'll drive costs up."

Hazel asked, "Can't we use the heat, maybe to drive a compressor? The sudden expansion of air could cool the rest. Harry?"

Harry hadn't time to answer. "What'll this cost?" I snapped.

"Roughly, 15 to 18 thousand," Dex replied.

"What?"

With fine impartiality, they ignored me completely. Harry continued, as though without interruption, "Ye-es, I guess a compressor-and-coolant system could be arranged . . ."

We broke up at 6 A.M. I took one of my pills, frowning at the bottle. Seemed to be emptying fast. Sleepily, I shook the thought off and faced the new day—little knowing the opposition had managed to skizzle us again.

The last displays were moons of Jupiter and Saturn; it was impossible to recreate tortured conditions of the planets themselves. Saturn's closest moon, Mimas, was picked.

Our grand finale: landing on Mimas with Saturn rising spectacularly out of the east. Mimas is in the plane of the rings, so they couldn't be obvious. We'd show enough, however, to make it damned impressive, and explain it by libration of the satellite.

The mechanics of realistically moving Saturn was rougher than a cob. And that's where the opposition fixed us. They claimed there wasn't enough drama in the tour. Let it end with a flash of light, a roar, and a meteor striking nearby.

The roar came from us. Mimas had no atmosphere—how could the meteor sound off or burn up? We finally compromised, permitting the meteor to hit.

We'd decided early the cus-

tomers couldn't walk through. Mel first, Harry, then Dex, together produced an electric-powered, open runabout. The cart ran on treads in contact with skillfully hidden tracks, for the current channel. A futuristic touch, that—we'd say the cart ran on broadcast power.

The power source provided cart headlights, and made batteries unnecessary for the guide's walkie-talkie and the customers' helmet receivers.

Mimas' last section of track was on a vibrating platform. The cart tripped a switch; when the meteor supposedly hit, the platform would drop and rise three inches, fast, twisting while it did—"enough," Mel said grimly, "to shake the damned *kishkas* out of 'em!"

We cracked that one, just in time for another. It began with Venus, as most of my problems had. We planned constant dust storms for Venus. Real quick, there'd be nothing left of the Bonestell's backgrounds but a blank wall, from mechanical erosion.

And how did we intend—?

Glass—

Too easily scratched. Lord, another one: how will the half-a-buck customers be able to see inside?

Glass and one of those silicon plastics?

Better, but—

Harry beat it: glass, plastic, and a boundary layer of cold air, jetted down from the ceiling, in front of the background paint-

ing and back of the look-in window. I was glad, for lately, Harry had begun to age. Thin and gray, he showed the strain—as did all of us.

We were sitting in an administration office at the park. I now recognized the symptoms; when the GG had no real problems, its collective mind usually turned to my health. I wouldn't admit it, but I felt a little peaked. Little? Hell, bone-tired, dog-weary pooped. Seemed every motion was effort, but soon it would end.

The phone rang. With the message, it *was* ended.

"Let's go, grouseketeers."

There was almost a pregnant pause. Six months: conception of the idea to delivery of finished product; six months, working together, fighting men, nature, and the perversity of inanimate objects—all of this now was done.

No one moved; Frank verbalized it: "I'm scared." She sounded scared.

"Better than being petrified, which I am," I answered. "But we might as well face it."

We dragged over to the TS building, an impressive structure.

The guide played it straight, told us exactly how to suit up. Then, in the cart, we edged into the tunnel that was the first lock, and—warned to set our filters—emerged onto the blinding surface of Mercury.

We felt the heat momentarily

—Mercury and Venus were kept at a constant 140 F, the others at 0 F—but it was a deliberate thrill. Then cool air from the cart suit-connections began circulating.

Bonestell was magnificent, as always. Yellow landscape, spatter cones, glittering streaks that might be metal in the volcanic ground—created by dusting ground mica on wet glue to catch the reflection of the sun. It was a masterpiece.

The sun. Black sky holding a giant, blazing ball. Too damned yellow, but filtered carbon arcs were the best we could do.

Down, into the tunnel that was lock two. This next one . . . Venus, obvious opposition point of attack, where we'd had the most trouble: Venus *had* to be right.

It was! A blast of wind struck us, and dust, swirling everywhere. We'd discovered there's no such thing as a sand storm—it's really dust—so we'd taken pains making things look right. Sand dunes were carefully cemented in place; dust rippling over gave the proper illusion.

Oddly shaped rocks, dimly seen, strengthened the impression of wind-abraded topography. Rocks were reddish, overlain by smears of bright yellow. Lot of trouble placing all that flowers of sulfur, but we postulated a liquid sulfur-sulfur dioxide-carbon dioxide cycle.

Overhead, a diffused, intense yellow light. The sun—we were on the daylight side.

I sighed, relaxed, knowing this one had worked out.

We gave the moon little time. For those who had become homesick, Earth was hanging magnificently in the sky. At a crater wall, we stopped, ostensibly to let souvenir hunters pick at small pieces of lunar rock without leaving the cart.

We'd argued hours on what type to use, till Mel dragged out his rock book. Most, automatically, had wanted basalt. However, the moon's density being low, heavier rocks are probably scarce—one good reason not to expect radioactive ores there. We finally settled for rhyolite and obsidian.

Stopping on the moon had another purpose. We kept the room temperature at 70 F, for heating and cooling economy; the transition from Venus to Mars was much simpler if ambient temperature dropped from 140 to 70 and from 70 to 0, rather than straight through the range.

Next, a Martian polar cap, and we looked down a long canal that disappeared on the horizon. Water appeared to run uphill for that effect. The whole scene looked like an Arizona highway at dusk—what it should have. To our right, a suggestion of—damn the opposition's eyes—culture: a large stone whatzit. It was a jarring note.

We selected one of those non-descript asteroids with just enough diameter to show extreme curvature. Frank had

done magnificently. I found myself hanging onto the cart. Headlights deliberately dimmed, on the rocky surface, the cart bumped wildly. The sky was black, broken only by little, hard chunks of light. No horizon. The feeling of being ready to drop was intense, possibly too much so.

Europa, then, in a valley of ice. We'd picked Jupiter's third moon because its frozen atmosphere permitted some eerie pseudo-ice sculpturing. As we moved, Jupiter appeared between breaks and peaks in the sheer wall. Worked nicely, seeing the monstrous planet distended overhead, like a gaily colored beach ball moving with us, as the moon from a train window. Unfortunately, the ice forms detracted somewhat.

Mimas, pitch black, then a glow. Stark landscape quickly becoming visible. Steep cliffs, rocky plain. Saturn rising. The rings, their shadow on the globe, the beauty of it, made me sit stunned, though I knew what to expect.

The guide warned us radar spotted an approaching object, probably a meteor. We ran, the cart at maximum speed—not much, really. It tore at you, wanting to stare at Saturn, wanting to duck.

Hit the special section, dropped and rose our three inches—one hell of a distance—and the tour was over. I kept thinking, insanely, that the meteor *was* a perfect conflict touch.

We unsuited silently. Finally, Hazel breathed, "Hallelujah!" It was summation of success. There now remained but one thing: wait for the quarry to show.

I estimated the necessary time at four days and nights after opening. It was hard to wait, hard not to fidget under the watchful—the only word—eyes of the GG. They were up to something, undoubtedly. But there was something far more important: I'd narrowed the 2,499,999,999 down to five.

The one I sought was a member of the GG.

Opening night brought Harry and Frank to my office. They tried to be casual, engaged me in desultory nothings. Frank looked reproachful—I was there too late.

The following night, Mel ambled in at midnight. He grinned, discussed a plot, suggested we go out for a beer, changed his mind, left.

The third night, I waited in the dark. Nor was I disappointed: Dex and Hazel showed.

"What do you want? It's 2 A.M.!"

There was a long regrouping pause; then Hazel said, "Dex has a fine idea."

"Well?"

"I've been thinking about gravity—"

"About time," I said sarcastically, disliking myself but hoping it would get rid of them, "we opened three days ago."

He ignored my petulance and

grinned. "No, I meant anti-gravity. I think it's possible. If you had a superconductor in an inductance field—"

"Why tell me?"

"Thought you'd have some ideas."

I shook my head. "That's what I hired *you* for. My only idea right now is going to sleep."

Bewildered, they left.

And on the fourth night, no one came. So I headed for the Tour. Now, having risked everything on my logic, I was a dead pigeon if wrong. There were only minutes left.

I eased through the back door, heard our automation equipment humming. Despite darkness, I shortcuted, nearly reaching the door to the service hallway in back of the planetary rooms. There was a distinct click, and a flashlight blinded me. I waited, stifling a cry, knowing if it were he, death was next.

Death never spoke in such quiet, sweet tones. Frank asked, "What are you doing here?"

Frank, Frank, not you!

Surprise shocked me: the light, her voice, the sudden suspicion. Still, diversion and counterattack . . . "Perhaps you've the explaining to do," I said nastily. "Why are you here?"

Her wide-eyed ingenuousness making me more suspicious, she answered, "Waiting to see if you'd appear." Then she stopped being truthful: "You forget we had a date—"

"We didn't have any damned

date," I said flatly, hurting deep within.

"All right, I want to know why you're still driving yourself. It isn't work; that's finished."

The way she talked made me hopeful. Maybe she wasn't the one . . . and then came fear. Frank, if he's here, you're in danger. The monster respects nothing we hold dear—law, property, dignity, life.

There was one way to find out: make her leave. I wrenched the flashlight from her, smashed it on the concrete floor. "I mean this: get the hell out of here, and stay out!"

She said, distastefully, "I've seen it happen, but never this fast. You've gone Hollywood, you're a genius, you're tremendous—forgetting other people who helped. Go ahead with your mysterious deal—and I hope we never meet again."

I struggled with ambivalence. This might be a trick; if not, Frank now hated me irreparably.

No time to worry about human emotions, not any more. Nausea reminded me of the primary purpose. I continued down the dark hallway, listening for Frank's return, hoping she needn't die.

Light was unnecessary: I knew the right door. Because it started here, it would end here. Quickly, silently, I slipped inside the Venus room. With peculiar relief, I realized Frank wasn't

it: my nose led me right to the monster.

In an ecstatic, semistuporous state, smelling strongly of sulfur dioxide, he couldn't have been aware of me. Couldn't?

"It took you long enough." He didn't bother to turn from the rock he was huddled against.

"I had to be sure." I felt anything but the calm carried in my voice. "No wonder the GG got the right answers, with you making initial starts. Say, were you responsible for the cat that rolled at me?"

"An accident. Obviously, I wanted this room built as much as you." Harry, now undisguised, languorously turned. "Your little trap didn't quite come off—a danger in fighting a superior intellect."

"No trap. I had a job to do; it's done."

"Job? Job?" Infuriated, leaping to his feet, he shouted, "Speak the native tongue, filth!"

"What's the use? Because of you, I'll never again have the chance. And you no longer have a native tongue."

"Who were those judges," he asked bitterly, "to declare *me* an outcast?"

"Representatives of an outraged society." I almost lost my temper, thinking of this deviant's crimes. "You were lucky to get banishment instead of death."

He grinned. "So were you."

"True. I tried to find the proper place, where you'd have some chance."

He laughed openly. "I fixed the ship nicely."

"You don't understand at all—"

"I counted on your being a hero, trying to save us. So, I escaped."

"For three years only."

"What do you mean?"

"One of us won't leave here."

Harry frowned, then tried cunning. "Aren't you being silly? We are hopelessly marooned. Surely there are overriding considerations to your childish devotion to duty."

I shook my head. "This is too small a room for us. Even if I trusted you, I couldn't allow you at this naive young world."

Voices suddenly approached. "The GG?" Harry questioned.

"Didn't know they were coming." Desperately, I looked about, found an eroded mass. "Hide there; I'll get rid of them."

"You'd better—we have business." Possibly it was the only time I've agreed with him. Mel and Dex came in. I called, "Over here!"

Dex snapped his fingers. "*Knew* it was Venus."

Mel wrinkled his nose. "Sulfur dioxide, too, like we figured. Soda pop, when I broke into that tender scene between you and Frank—that gave you necessary carbon dioxide, right, am I not?"

"Yes . . . Why don't you guys leave me alone?" Beginning to falter in the heat, they dripped

perspiration. "You could die in this chilly climate."

Dex said, "Listen for a second. We don't have to break up. Let's form a service organization, 'Problems, Inc.' or some equally stupid title. Very soon we could afford a private bedroom, like this, for you to stay in all the time—"

"Need only two or three nights in ten." Harry was moving restlessly. He wouldn't wait much longer. "Combination of oxygen, carbon dioxide, and sulfur under relatively high temperature is how I eat. Pills can substitute, but not for protracted periods. That's why I had to build this room. Couple of weeks, and I'll be in the pink; as pink as you, anyway."

Abruptly, I lay down, ignoring them. I had to make my friends go. Harry could literally have shredded them. Footsteps: the door closed; relief and loneliness joined me, but only for a moment.

His voice sliced the darkness: "I'm a man of honor, and must warn you. If we fight, you'll lose. I escaped with far more pills than you; you're weaker."

I said sardonically, "With you stealing parts of my supply, that's probably the only truthful thing you've said!"

"I've been in here three nights, adjusting my metabolism . . ."

He came at me then, not breaking his flow of speech. At home, I'd have been surprised at the dishonor. Instead, I was ex-

pecting it. He ran into my ball-
ed fist.

If we'd been home . . . if, if, if, if. At full strength, I could have broken his neck with the blow. Now, he simply rolled back and fell. Laughing, he attacked again. We were weak as babes, and fought like it. Clumsily, slowly, we went through the motions.

He'd been right—he was a little stronger, and the relative difference began to tell. Soon I was falling from his blows.

Hands on my neck, he kned me hard in the stomach. Violently ill, I felt the sulfur dioxide rush from my lungs.

I remembered one trick they'd taught at school, and I used it. Unable to break his hold, I managed to get my hands around his throat. We locked, each silent.

Silent until I felt my last reserves going, until the crooning of the Song of Eternity began. This couldn't happen, not to this planet. With all my strength, I gave one last squeeze—but it failed. From somewhere, light-years of light-years away, I heard Frank, realized I'd played the fool: she'd been working for the monster.

A blinding flash inside my head—and the Last Darkness descended.

The light hadn't been inside my head: it flooded the room. Dimly, I was aware of the injection, and immediately felt better. Harry was gone.

The GG, minus one, was gathered around. Mel said, "It was a dilute solution of cerium nitrate. We figured the percentage on the basis of the pill Frank swiped. Hope you aren't poisoned."

"No." My voice was weak, "Need it. Oxidizing agent for the sulfur."

"Harry's dead," Hazel frowned. "When we came in, you'd broken his neck, were crooning to yourself."

So I had been crooning the Song of Eternity? "I'm a"—I felt silly—"a cop on a mission. I waited until whichever of you it was settled down here. That one had to be the criminal, to be done away with."

"Dex and I got rid of the body," Mel said. "No need to worry unless . . . unless you've read my stories. Perhaps *you* are the criminal. I'll be watching."

"No proof, of course . . . Do *you* believe I'm the criminal?"

Mel smiled. "No, but I'll watch anyway."

"More closely than tonight, I hope," Hazel said acidly. "If it hadn't been for her . . ."

I saw Frank, and was ashamed of my suspicions. She was silent, looking concerned. They all did, and I was warmed. Because, despite discomfort, they worried about me, an alien, a stranger. "Better leave. Heat's getting you."

Dex asked, "When are you going back?"

I shrugged. "Never. The ship is in the Gulf of California . . . Harry did that."

"What about our company? We can research anti-gravity. You might reach home yet."

I shook my head. "Said I was a policeman. I don't know very much—"

"Perfectly normal!" Mel said before Hazel shooshed him.

Dex was insistent: "Any cop knows at least something about his motorcycle. Was I right about the superconductor?"

"Yes. Now, get out of here, idiots, before there's no one left to form the company!"

Hazel, perspiring freely, red hair shimmering, kissed me. "We figured you out real, real early. We aren't ever wrong, and I'm glad we stayed with you, Mr. Venus." She laughed joyously, "First time I've ever kissed a Venusian!"

Frank, head close to mine, said softly, "I'm terribly sorry I said those things, but you had to believe I was angry, so I could call the others—"

"And I did everything possible to get you out . . ."

We were silent; then I said what I'd been fighting not to, for so long. "Frank . . . Francis?"

She understood, and stared horrified at me. I'd lost. Bowed my head, feeling like the damned fool I was.

She looked around the room. "It's so strange!"

"And with ingrained racial conditioning, you couldn't re-

spond to a thin, sallow alien."

"I don't know," she said hesitantly.

"I do!" Mel said. "The oldest story in science fiction; it's true; I can't write it."

"Why not?"

"No editor in right or wrong mind would buy the beautiful Earth damsel, after whom lusts the Monster from Venus—"

Frank snapped: "He isn't a monster! And his manners are better than many writers' I could name . . ."

Her voice trailed off with awareness of Mel's tiny smile—a smile that widened. He pulled her toward the door. "What a story! We'll hold the wedding in a Turkish Bath."

Alone, I sighed, comfortable again after three years. I was

grateful to the GG, and would do anything, within limits, for them. Yet, my newly adopted planet needed protection. Babes in the woods, they'd be torn to pieces outside.

Fortunately, the GG didn't know my meaning of "policeman," my home's highest order of intellect. I'd assure the group finally getting anti-gravity and use of planetary lines of force. But not the hyperspace drive, not for a good long while.

I certainly couldn't destroy the GG's confidence. I couldn't hurt them. They were so sure about me—so sure they were never wrong. How could I explain I'd been looking for a decent, habitable planet like Venus to discharge my captive, that I was from another galaxy?

THE END

(cont. from page 79)

Much more needs to be done, of course, and can be done—here and now.

For example: The limonite cycle for obtaining water and oxygen from the Martian soil can be checked out in detail. The reproduction rate, carbon dioxide consumption, the nutrient needs of airborne algae such as *Nostocaceae* can be examined with an eye of seeing how efficiently such plant life could change the atmosphere of Venus into a terrestrial nitrogen/oxygen mixture.

materials since they would be handled in much the same way as the planetoids. Nor have we considered J. D. Bernal's suggestion, made during the 1920's, that man might build artificial planets around the Sun at the same distance as Earth's orbit. Such a project, ending with a spherical shell of artificial worlds around the Sun, may be possible in time. But it seems likely that it would be easier to shape the already-existing planets to man's needs and desires.

KIMO

By AL SEVCIK

Kimo was alone and frightened as he went forth into ruin looking for a friendly face. He found none, but perhaps sympathy and understanding were still available at ten cents a bottle.

PANTING hard from the short climb, Kimo stood at last on the top of the small hill. His shriveled frame shook sporadically as he hunched his shoulders against the sharp night wind that had cried at him across New Mexico and followed him now, like a chill spirit, across the plains of Texas.

The wind fluttered a ragged strip of garment that hung, through habit, from half of his belt, for only one thigh was covered, his left was bare. Strips of some unidentifiable cloth flapped against his ribs which protruded above his sunken stomach more like the bones of a skeleton than the body of a man.

He stood still for a minute looking at nothing through watery old eyes, then sighed and slowly squatted on emaciated

legs close beside a protecting bush. Painfully he adjusted tired muscles until he sat fully on the rocky ground. Then, nodding his head forward, he closed his eyes and prepared to die.

"I'm old," he thought, not understanding numbers. "Too damn old." His childhood, forgotten somewhere in the desert, had passed into a lifetime of tending goats, and planting, and hunting on the brilliant reds and blacks of the southwestern wastelands. Alone, except for yearly trips to a sun-blackened desert town, eight sandy little shacks and a store and a bar, and other old men like himself. This was his life, the sun, the sand-laden wind, the sudden angry storms, and four to six straggly female goats that gave him milk sometimes, and stood with him against the desert.

One night, Kimo, squatting on the sand, had seen bright flashes march across the horizon, and in the daytime great, oddly shaped clouds had rode the sky. There had been flashes for many nights, Kimo couldn't count how many, and always he had turned his eyes away, afraid.

He couldn't go to town that year because of the prolonged sickness that left him weak and caused the hair to fall from his body. Two of his goats died. Kimo got better, but after that his breath came shorter, and he was thin and tired easily. He stayed in the desert for three more years, living as he always had, then one day he sensed the last sun coming and he led his goats to town again, for he wanted to die near men, not alone among goats in the desert.

But the town was empty. Broken doors revealed a barroom of smashed glass, sparkling amidst stains of liquor long since dried. The store, also, was wrecked, but there were some canned goods left and Kimo took a few of these and started to walk. He told himself he was going to find men, but he didn't know where the men were and there was no one to ask, so he just walked as far as he could each day without thinking much about it. It had been a long, long time since he had thought much about anything and even then he hadn't known many words so his thoughts had been simple, and confused with unexplained feelings.

Now, sitting on the dark windy hill, Kimo pondered briefly on the empty journey, and his eyebrows lowered in a bewildered frown. He had happened across other towns, all, like his, vacant except for growling dogs and thin, starving cats that seemed to look at him almost as if he were to blame for something. He found larger areas, too, of twisted steel and shattered buildings but these hadn't impressed him as much as the abandoned towns because he had never known what a city should look like.

Kimo's mind drifted. He had been walking for a long time now, he remembered. For many days, even before the cold wind came. He shivered. His feet were bare and sore. Each day he had walked a little less far and today, he tried to think, today he had hardly walked at all. Now he was too weak to go on. He would die here, cold and alone, like an animal. He sniffed and his eyes suddenly overflowed across his sunken cheeks. He cried softly.

He dozed for awhile, then woke again because he was an old man and slept in fits. The wind had stopped, leaving the night still. Kimo slowly raised his head and looked blankly at the dark, clear sky. His gaze drifted past the silhouettes of shrubs and occasional trees, past the yellow moon, the sharp white stars, and the red light twinkling faintly on the horizon. He

lowered his head, then suddenly jerked it erect again.

"Red light?" He stared at it through squinted eyes and saw that its flashing was not the ordinary twinkling of a star but regular, on and off. "It's not a star," he thought. "It must be . . ." he didn't want to think the word, to open himself to disappointment, but he couldn't stop. "It must be men!"

Kimo stared hard at the flashing redness, excitement slowly welling up within him and tensing his frail, stringy muscles. To be with men again!

When dawn came and the light disappeared, he had estimated its distance. "Two days and nights," he thought, and, wondering if he could last, he rose and started out.

He walked steadily all day, painfully concentrating on placing one foot before the other. After a few hours his foot sores broke and red drops glistened in the grass behind him. Later on he stumbled across a broken, overgrown road going in the same direction, and gratefully climbed up on its relatively smooth surface. He stopped once to drink at a well that had collapsed on one side, and once more to take some vegetables from a fenced off patch behind a creaking farm house. When evening came Kimo stopped at times and rested, leaning against a post or stunted tree. He didn't dare pause for long, or to sit at all, for he felt that his body might not start again.

After it was dark he climbed a small rise and fearfully inspected the horizon, afraid that the light might not be there, that the men would be gone. He didn't see it at first and almost cried out in panic, then it flashed to his right and Kimo sighed, trying to calm his heart. It didn't seem so far away now, but he still couldn't make it out, just a red, pulsating glow in the night.

The moon rose as he stood there, and Kimo knew that if he turned around he might see the hill where he stood shivering the night before, but he didn't turn, he didn't want to remind himself that an old man must spend a day walking a distance a youth could run in hours.

He trembled in the cold wind that had come with the moon's rise, turned, and walked on down the cracked road that crawled from the darkness ahead of him and vanished into the darkness behind. The wind chilled his back and he stooped as he walked staring at the road ahead, blind to the empty land that moved away on either side. The cold aches and pains became part of his existence and he didn't consciously notice their drumming background in his dreams of the men ahead, men to give him food, to make him warm, and, most of all, men simply to be with so he wouldn't have to die alone.

In the morning it began to rain, and his few torn rags clung tight but offered no practical

protection from the large damp insects that splatted against his skin.

For intervals now he forgot where he was. The rain and the cold would vanish and he'd be sitting in the warmth of his desert shack watching the evening sun paint the sands. Sometimes he seemed a boy again, and forgotten memories would churn for a moment then slowly sink back out of the light. In between times he dreamed of the men ahead and tried not to think how pitifully slow his limping body moved.

He looked up suddenly, it was dark and the red flashed just beyond, obscured by something, he couldn't see what. But his body was exhausted now, failing. Every step was slow, every breath was hard. Each motion meant pain.

Beside him low walls and dark piles of rock clung close against the ground. But further ahead the road slid past twisted iron spires that jabbed at the pale night sky, and hollow buildings that gazed silently as shrouded spectres. The rain had stopped and things dripped softly in the dark.

Drawn by the hypnotic pulsing of the red haze, Kimo left the road and crawled across rubble strewn lots and through the black shadows of the ragged buildings. "Men!" He tried to

call, but his throat was dry and his lips worked soundlessly.

At last he crawled to the final building before the blazing red and, hardly noticing the raw soreness of his body, slowly pulled himself erect, hand over hand up the rough side of the building, to meet these men as a man, on his feet. He staggered to the corner.

A protruding hook caught his belt, broke it, and sent Kimo crashing to his knees in the mud of yesterday's rain.

Red beat down on him, pulsing through his pain-closed eyelids like a gigantic heartbeat. Slowly Kimo raised his head and looked up at the great red light flashing above him over and over, "... A COLA." An automatic sign, three letters broken, powered by its own atomic pile, designed to last forever.

Kimo didn't understand signs or know that the flashing script was a thing to read, but suddenly he knew that there weren't any men around, that there hadn't been for a long, long time.

He seemed to shrink slightly, then with an abrupt cry, he stood and hurled a stone full at the light. Glass broke. The flashing stopped.

Kimo's muscles failed and he sat heavily, naked, on the ground. Tears suddenly flooded across his cheeks, and his sagging body shook again and again with sobs as the sun slowly rose in the sky.

THE END

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